INTRODUCTION

In April 2008, Southwestern Energy, a Houston based drilling company, began natural gas drilling operations with a well in rural Susquehanna County, Pennsylvania. This well was drilled using a technique called hydraulic fracturing, which is a method of drilling that
increases production by fracturing, or cracking, rock formations that contain oil and gas.² Two and a half years after the drilling began, fourteen families filed a lawsuit, Berish v. Southwestern Energy Production Co., alleging damages ranging from health injuries to loss of enjoyment of property.³ Among other things, the plaintiffs alleged trespass and contended that pollutants and industrial waste migrated onto their properties and contaminated well water supplies, which were later consumed by the plaintiffs.⁴ This case remains pending before the United States District Court for the Middle District of Pennsylvania as of April 2011. With the rapid development and proliferation of hydraulic fracturing drilling techniques and technology, questions have arisen concerning the liability of natural gas operators for extending fractures, treatment fluids, or causing stray natural gas to migrate into the subsurfaces of neighboring properties.

The Texas Supreme Court became the first court in the country to address the issue in Coastal Oil & Gas Corp. v. Garza Energy Trust.⁵ The Texas court held that trespass resulting from hydraulic fracturing activities was not actionable where drainage was the only alleged damage.⁶ The recent massive expansion in drilling activity in the northeast, largely due to geological surveys showing massive reserves of natural gas locked in a rock formation called the Marcellus Shale, will likely result in more cases similar to Berish arising in the future. As such, answering the issue of subsurface trespass liability has important ramifications for the oil and gas industry, subsurface and surface property owners, as well as the environment itself. Berish provides a unique opportunity for the District Court for the Middle District of Pennsylvania to produce an opinion that could guide future cases in Pennsylvania, as well as other Marcellus Shale states that will inevitably face similar questions.

A significant number of known “unknowns” concerning the environmental consequences of using these extraction techniques and technologies have yet to be adequately answered by the industry or peer-reviewed academic research. In particular, questions remain as to what effect these drilling operations have on groundwater and soil contamination. This is important because the Marcellus Shale under-

². Id.
³. Id.
⁴. Id.
⁵. 268 S.W.3d 1, 1 (Tex. 2008).
⁶. Id. at 12.
lies nearly 40% of the Delaware River Basin, which supplies water to millions of people in the mid-Atlantic region. Pennsylvania courts should set aside the Garza opinion as either wrongly decided or narrow in scope, and instead recognize trespass from hydraulic fracturing activities as an actionable claim, without the need to demonstrate harm. This position of instituting a “traditional” trespass liability scheme for this type of drilling activity is supported not only by a plethora of public policy concerns, but also by common law precedent. Courts should not place evidentiary burdens on trespass plaintiffs to prove harm when there is so much uncertainty about the actual effects of hydraulic fracturing activities. In the alternative, a review of relevant case law suggests that trespass from hydraulic fracturing activities should at least constitute an actionable trespass claim where the plaintiff can demonstrate actual damage or harm.

This Note provides a description of the Marcellus Shale formation in Pennsylvania, the hydraulic fracturing, a history of trespass and the rule of capture, relevant case law from gas producing jurisdictions, an analysis of existing case law and its potential application to Pennsylvania, and lastly, a brief summary arguing that Garza should not be applied to Pennsylvania.

I. Shale Rock Geology and the Marcellus Shale

The lower forty-eight states in the U.S. contain various highly organic shales that contain vast deposits of hydrocarbons, such as natural gas, locked within them. These shales developed millions of years ago as a result of large amounts of plant and animal life settling on the bottom of a seabed. Deposits of silt then covered this organic material and pressure, heat, and bacteria slowly converted it into hydrocarbons. These hydrocarbons were locked into layers of sediments which, over a long period of time, created the shale rock for-
The millions of tiny pores contained within these rock formations have the ability to store substantial amounts of oil and natural gas. The chemical makeup of the natural gas from shale is typically 90% methane, which is currently a highly valuable commodity for both power generation and heating. There are over twenty identified shale formations containing recoverable natural gas deposits in the U.S., but none have shown as much promise as the Marcellus Shale.

The Marcellus Shale underlies large portions of New York, Pennsylvania, West Virginia, Ohio and western Maryland with an estimated depth ranging from 4,000 to 8,500 feet under the Earth’s surface. It is the largest known gas producing shale play in the world, covering over 90,000 square miles, an area slightly larger than the state of Colorado.

The Marcellus Shale is said to have “favorable mineralogy” in that it is a highly porous, low-density rock and it contains a significant amount of recoverable natural gas. A recent survey by the U.S. Department of Energy estimates a range from 260 to 490 trillion cubic feet of recoverable gas in the Marcellus Shale. To put that in perspective, consider that one trillion cubic feet of natural gas can heat fifteen million households for an entire year. As such, many energy experts believe the Marcellus Shale has the potential to be enormously profitable and a “game changer” in the energy industry. Currently, nearly 25% of the total energy consumed in the United States is derived from natural gas, and some estimates of the value of the gas reserves found in the Marcellus Shale number several trillion dollars. Additionally, concerns over climate change have increased pressure to

11. SUMI, supra note 9, at 2.
12. CLARK, supra note 10, at 6.
14. Id. at 2.
15. Id. at 17.
16. SUMI, supra note 9, at 2.
17. Id. at 3.
19. Id.
switch from coal to natural gas because of its relatively low carbon output. Shales typically have limited permeability; therefore, in order for this gas to be released in commercially viable quantities, the shale must either have natural fractures, or in the alternative, artificial fractures must be created in the rock via hydraulic fracturing operations.\footnote{SUMI, supra note 9, at 2.}

II. Hydraulic Fracturing and Horizontal Drilling

Although it has long been known that natural gas exists in the Marcellus Shale in large quantities, it was not until recently that technological improvements allowed for extraction to become a commercially viable business model.\footnote{John A. Harper, The Marcellus Shale – An Old “New” Gas Reservoir in Pennsylvania, 38 PA. GEOLOGY, no. 1, 2008 at 2, http://www.dcnr.state.pa.us/topogeo/pub/pageolmag/pdfs/v38n1.pdf.} In particular, two major innovations played a significant role in making the development of the Marcellus Shale possible: horizontal drilling and hydraulic fracturing.\footnote{Id.}

In many shale formations, including the Marcellus Shale, the pore spaces are not large enough to let the molecules of natural gas flow through them.\footnote{U.S. DEPARTMENT OF ENERGY, supra note 8, at 15.} Therefore, in order to commercially produce natural gas from these formations, drillers need to fracture the formation to increase the formation’s permeability.\footnote{SUMI, supra note 9, at 2.} A well is first drilled down vertically until it reaches a few hundred feet above the depth of the shale formation.\footnote{Harper, supra note 23, at 10.} The driller then deviates the wellbore and directs it in an arch shape until it reaches a horizontal orientation across the formation, now parallel with the surface.\footnote{Id.}

Drillers use this technique for extracting gas from shale for several different reasons. The primary reason being that the wellbore is exposed to a far greater surface area of the formation, thus generating a much larger return of natural gas than from simple vertical wells. While this technique has existed for a number of years, recent im-
Improvements in technology have made horizontal drilling a far more cost-effective option.29

The most important innovation that has led to the rapid development of shale formations is that of hydraulic fracturing, also known as “fracking.” Fracking involves injecting a large amount of fluid into the wellbore at high pressure in order to increase its productivity.30 The fluids that are injected contain a cocktail of water, sand (proppants), chemicals, and other friction-reducing substances.31 The high pressure with which these fluids are pumped into the well create new cracks in the rock, in addition to the natural fissures, and then prop these cracks open with sand, exposing the wellbore to a greater surface area and thus, more natural gas.32 The fracking fluids developed in the last decade maximize the length of the fracture to distances that previous iterations could not achieve.33 By creating a more porous and permeable target area with these extended artificial fractures, the use of these fluids allows significantly more natural gas to be exposed to the wellbore and recovered.34

The exact chemical make-up of the fracking fluids is unknown, as it is confidential proprietary information and exempted from federal regulation by the 2005 Energy Act.35 While these new techniques and technologies have increased the viability of drilling for natural gas in the Marcellus Shale, they have also generated significant concerns and questions about their impact on the environment and property rights.

The issue of trespass is particularly problematic, as a potential trespass from these hydraulic fracturing activities can arise in a number of different ways. The first is simply to have a horizontally drilled wellbore itself strike underneath another’s property. Second, if an artificially created fracture extends from underneath one property into another, this could constitute a trespass. This was the situation presented in the Garza case, where artificial fractures extended onto another’s property and drained gas from that property. Lastly, and potentially most significant, trespass questions arise where hydraulic fracturing

31. Id.
32. Id.
33. Id.
34. Id.
operations cause the subsurface migration of fracking fluids or natural
gas into another’s property.

III. The History of Trespass and the Rule of Capture

Trespass comprises a number of types of claims that can act together
to provide a flexible form of relief in response to differing circumstances. It has been modified as a form of liability in a variety of
ways since it was originally articulated. Traditionally, the gravamen of trespass was understood as to provide protection to the legal inter-
est of the owner of an estate, rather than protection from actual damage to the estate.36 This principle of exclusive protection is reflected
in the black letter law of trespass, which states that “‘[e]very unauthorized entry upon another’s realty is a trespass, regardless of the de-
gree of force used or the amount of damage.’”37 For example, even a
de minimis physical intrusion by the government could be “actionable
as a taking because there has historically been no de minimis defense”
to trespass.38 For the purposes of this Note, this original understand-
ing of trespass will be expressed as the “traditional” definition of tre-

In the context of property contamination over time, however, the
traditional definition of trespass eroded as the courts in an increasing
number of circumstances began requiring property owners to prove
substantial damage to their property.39 This requirement, to demon-
strate harm from hydraulic fracturing activities in a trespass claim,
will be discussed in more detail later in this Note.40

The traditional understanding of trespass has also been modified by
the rule of capture. The common law phrase “*cujus est solum ejus
usque ad coelum et ad inferos*” articulates the traditional view that
ownership of the surface extends upwards to the heavens and down-
wards to the center of the earth.41 Under this conception of property,
ostensibly, any intrusions to the ground or air above one’s property

36. Robert H. Cutting, “One Man’s Ceilin’ is Another Man’s Floor”: Property
37. Id.
38. Id.
39. Id. at 876.
40. See discussion infra Section VI.
41. Osborne M. Reynolds, Jr., Distinguishing Trespass and Nuisance: A Journey
could result in a trespass claim. However, this theory of ownership was rejected by the United States Supreme Court, when it stated that such a theory had “no place in the modern world.” 42 Strict adherence to this principle would have hindered the ability to drill for and exploit important natural resources. 43 As drilling technologies have advanced, courts have made corresponding exceptions to the old common law rules of traditional trespass. The Texas Supreme Court recognized that trespass needed to apply differently to situations where subsurface resources were being exploited in order to make such operations commercially viable. 44

The rule of capture was succinctly described in Elliff v. Texon Drilling Company, where the U.S. Supreme Court stated:

[C]ourts generally have come to recognize that oil and gas, as commonly found in underground reservoirs, are securely entrapped in a static condition in the original pool, and, ordinarily, so remain until disturbed by penetrations from the surface. It is further established, nevertheless, that these minerals will migrate across property lines towards any low pressure area created by production from the common pool. This migratory character of oil and gas has given rise to the so-called rule or law of capture. That rule simply is that the owner of a tract of land acquires title to the oil or gas which he produces from wells on his land, though part of the oil or gas may have migrated from adjoining lands. He may thus appropriate the oil and gas that have flowed from adjacent lands without the consent of the owner of those lands, and without incurring liability to him for drainage. 45

This rule encouraged the development and exploitation of natural resources in the U.S. by modifying the potential obstacles of the ad coelum doctrin and traditional trespass liability. By recognizing the fugacious nature of oil and gas and allowing drilling operators to extract gas from under another’s property, the courts paved the way for the development of the oil and natural gas industry as it exists today. Moreover, ownership theories of subsurface mineral rights evolved in

42. United States v. Causby, 328 U.S. 256, 261 (1945).
43. Id.
45. 210 S.W.2d 558, 561-62 (Tex. 1948).
response to the rule of capture. The owner of subsurface mineral rights developed the ability to sever those rights from the surface rights, thus allowing the owners of the mineral rights to lease them to drilling companies. The drilling companies could then extract the subsurface oil or gas, and subsequently provide the owner a portion of the profits. Despite these developments, legal questions remain as to the exact extent to which the rule of capture modifies common law trespass in the context of hydraulic fracturing activities.

IV. Prior Texas Case Law and Coastal Oil & Gas Corp. v. Garza Energy Trust

A series of cases in Texas have considered the issue of whether subsurface trespass from hydraulic fracturing activities could be an actionable trespass. In two companion cases, known as the Delhi-Taylor cases, the plaintiffs desired to enjoin a frack operation via, inter alia, a subsurface trespass claim. In both of these cases, defendants Gregg and Holmes attempted to drill wells that they planned to hydraulically fracture. The wells each were less than 100 feet from the property boundary of Delhi-Taylor Oil Corporation. Delhi-Taylor argued that the subsurface fractures created by the defendants’ wells would extend horizontally onto his property. The Texas Supreme Court, however, never reached the merits of the plaintiff’s claim. The court was only asked to rule on the procedural question of whether or not the district courts had jurisdiction to rule on this issue, or whether that authority lay with the permitting and regulatory

47. Id.
48. Id. at 316-17.
51. Gregg, 344 S.W.2d at 412; Holmes, 344 S.W.2d at 420.
52. Gregg, 344 S.W.2d at 411.
53. Id.
54. Id.
body in Texas, the Railroad Commission.\textsuperscript{55} The court found that trespass issues were “inherently judicial in nature,” and that the district court had jurisdiction.\textsuperscript{56} Despite this narrow holding the court stated in dicta that:

We think the allegations are sufficient to raise an issue as to whether there is a trespass. The invasion alleged is direct and the action taken is intentional. Gregg’s well would be, for practical purposes, extended to and partially completed in Delhi-Taylor’s land. The pleadings allege a physical entrance into Delhi-Taylor’s leasehold. While the drilling bit of Gregg’s well is not alleged to have extended into Delhi-Taylor’s land, the same result is reached if in fact the cracks or veins extend into its land and gas is produced therefrom by Gregg.

Thirty years later, the issue was revived in \textit{Geo Viking, Inc. v. Tex-Lee Operating Co.}\textsuperscript{57} In this case, Tex-Lee, a gas company, hired Geo Viking, a hydraulic fracturing company, to perform a frack job on an existing well site owned by Tex-Lee.\textsuperscript{58} Because of an equipment failure, the frack job was unsuccessful and the well was abandoned.\textsuperscript{59} Tex-Lee then brought an action against Geo Viking in an attempt to recover the value of the hydrocarbons that they would have obtained had the frack job been successful.\textsuperscript{60} Geo Viking argued that the value of any hydrocarbons obtained from beyond Tex-Lee’s property should not be included in damages, because the fracture would have passed under the surface of an adjoining property and Tex-Lee would have

\textsuperscript{55} \textit{Id.} at 412. The question here is whether the courts of Texas have and will exercise the power to grant injunctive relief to preserve the status quo upon allegations and proof that a neighbor is about to fracture an oil or gas producing horizon beyond his property lines for the purpose of increasing the productivity of the neighbor’s well. More broadly, the question is whether the courts have the power to determine whether a subsurface trespass is occurring or is about to occur, or whether the Railroad Commission has this power to the exclusion of the courts, with the courts having the power only to review, under the substantial evidence rule, or otherwise, the action of the Commission.

\textsuperscript{56} \textit{Id.} at 415.

\textsuperscript{57} 817 S.W.2d 357.

\textsuperscript{58} \textit{Id.}

\textsuperscript{59} \textit{Id.} at 359-60.

\textsuperscript{60} \textit{Id.}
had no right to them as they would have been obtained through trespass.\textsuperscript{61}

The Honorable Justice Ben Z. Grant, writing for the Court of Appeals of Texas, initially disagreed with Geo Viking’s argument, stating that their position was in “direct conflict” with the rule of capture.\textsuperscript{62} On a motion for rehearing, however, Justice Grant reversed his position, stating that “Tex-Lee could not claim as damages loss of oil and gas to which it was not entitled.”\textsuperscript{63} Justice Grant analogized a frack job with that of a slant-well bottomed on another’s property, therefore concluding that fracturing below another’s property constituted subsurface trespass.\textsuperscript{64} Despite Justice Grant’s reversal, the other two appellate judges remained convinced that Justice Grant’s original logic was persuasive.\textsuperscript{65}

The Texas Supreme Court later granted a writ of error for the Geo Viking case.\textsuperscript{66} The court reversed the court of appeals decision in a per curiam opinion, holding that “[f]rac[k]ing under the surface of another’s land constitute[d] a subsurface trespass.”\textsuperscript{67} The opinion stated that the court of appeals’ reliance on the rule of capture was “misplaced” and that “[a]lthough oil and gas are subject to legitimate drainage under the law of capture, the owner is accorded the usual remedies against trespassers who appropriate the minerals or destroy their market value.”\textsuperscript{68} However, a mere six months after the initial opinion was handed down, it was curiously withdrawn.\textsuperscript{69} Additionally, the court stated that, “we should not be understood as approving or disapproving the opinions of the court of appeals analyzing the rule of

\begin{table}
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\textbf{Item} & \textbf{Reference} \\
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61 & Id. at 364. \\
62 & Geo Viking, 817 S.W.2d at 364. \\
63 & Id. at 365 (Grant, J., dissenting). \\
64 & Id. at 364-65. \\
65 & Id. (majority opinion). \\
67 & Id. at *2. \\
68 & Id. \\
69 & At least one commentator has suggested that the Geo Viking court withdrew its earlier opinion on public policy grounds, perhaps even on the strength of an amicus brief from Dowell Schlumberger, Inc. See Laura H. Burney & Norman J. Hyne, \textit{Hydraulic Fracturing: Stimulating Your Well or Trespassing}, 44 \textit{ROCKY MTN. MIN. L. INST.} 19 (1998).
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capture or trespass as they apply to hydraulic fracturing.” Further complicating matters, during the interim period before the Geo Viking case was withdrawn, Gifford Operating v. Indrex, Inc. was decided by the United States District Court for the Northern District of Texas, which held, relying on Geo Viking, that “sand fracturing across lease lines amounts to subsurface trespass.” Whether or not Gifford is still good law is debatable as a significant portion of it is based on the withdrawn Geo Viking opinion.

Another significant case is Railroad Commission of Texas v. Manziel. In this case, the plaintiffs were landowners who wanted to set aside an order by the Railroad Commission that authorized the operator on an adjacent tract of land to drill a well for an enhanced secondary oil recovery project. Water would be injected into the well in order to facilitate further production of hydrocarbons from the well. The landowners claimed that the water injection would undoubtedly migrate across their property boundary and constitute a trespass. The question that ultimately came before the court was “whether a trespass is committed when secondary recovery waters from an authorized secondary recovery project cross lease lines.” The Supreme Court of Texas found that when the commission authorizes a secondary recovery project, the “technical rules of trespass have no place in the consideration of the validity of the orders of the commission,” and, as such, no trespass is actionable. The court primarily relied upon the fact that the Railroad Commission had issued an order approving the project and, therefore, this case was not a traditional trespass case, but rather a suit brought to force the Railroad Commission to cancel one of its administrative orders.

Following these fragmented rulings it was unclear whether the Texas Supreme Court would recognize a cause of action for trespass by subsurface hydraulic fracturing. Whatever the value of the reasoning

72. 361 S.W.2d at 561.
73. Id. at 566.
74. Id. at 566-67.
75. Id.
76. Id. at 567.
77. Manziel, 361 S.W.2d at 568-69.
78. Id. at 566.
in both the Delhi-Taylor cases and the Geo Viking case, it was diminished by the way in which the Texas Supreme Court eventually addressed them in Coastal Oil & Gas Corp. v. Garza Energy Trust.79

A. Coastal Oil & Gas Corp. v. Garza Energy Trust

The significance of the ruling in Garza is evinced by the two years it took the Texas Supreme Court to make the decision and by the plethora of amicus briefs that were filed in the case by the Texas Oil & Gas Association, the American Royalty Council, the Texas Alliance of Energy Producers, Schlumberger Technology Corporation, and Halliburton Energy Services.80 The case arose when a subsurface mineral interest owner, Salinas, filed suit against the lessee, Coastal Oil & Gas Corporation ("Coastal").81 Salinas owned the mineral rights to a 748-acre tract of land in South Texas, referred to as Share 13.82 Coastal acquired the lease to Share 13, which required them to develop the oil and gas from that property and pay Salinas a share of the profits.83 Coastal also owned the full mineral interest in Share 12, an adjacent property.84

The two shares overlie the Vicksburg T formation, which is a natural gas reservoir located about 12,000 feet below the Earth’s surface.85 The Vicksburg T is known as a “tight” sandstone formation, which requires hydraulic fracturing in order to commercially extract natural gas.86 To extract gas from the reservoir, Coastal placed a well named “Coastal Fee No. 1” on Share 12, about 467 feet from the property line of Share 13.87 This was the closest that the well could have been placed to Share 13 that could have been granted a permit by the Rail-

79. Garza, 268 S.W.3d at 11-12.
81. Garza, 268 S.W.3d at 5.
82. Id.
83. Id.
84. Id.
85. Id.
86. Garza, 268 S.W.3d at 6.
87. Id.
road Commission under its spacing regulations.\textsuperscript{88} This vertical well was then fracked with the fractures designed to extend horizontally somewhere between 1,000 and 1,500 feet from the well in order to harvest the gas.\textsuperscript{89} As such, the designed length of the fracture would have extended it from Share 12 into Share 13 by roughly 500 to 1000 feet.\textsuperscript{90}

Experts for both parties disputed the “effective length”\textsuperscript{91} of the fractures, but it was undisputed that the fractures themselves were designed to extend into Share 13.\textsuperscript{92} The expert for Salinas concluded that 25\% to 35\% of the gas extracted by the well on Share 12 came from underneath Share 13, while Coastal’s expert claimed that no gas came from Share 13.\textsuperscript{93} Salinas argued that Coastal’s lease required it to develop Share 13 in such a way so as to protect Salinas’ interests.\textsuperscript{94} By extending the fractures from an adjacent property, Salinas was not being properly compensated for gas that originally rested beneath his property.\textsuperscript{95} Salinas alleged, among other things, trespass via Coastal’s hydraulic fractures and claimed between $388,000 and $544,000 in damages.\textsuperscript{96}

On the trespass claim the jury found that Coastal had in fact committed a subsurface trespass on Share 13, causing drainage, and awarded over $1 million in damages for lost royalties.\textsuperscript{97} This amount was subsequently reduced by the Court of Appeals of Texas, but the holding of liability under trespass remained.\textsuperscript{98} Coastal then filed a petition for review, which was granted by the Texas Supreme Court.\textsuperscript{99}

The first thing the Texas Supreme Court had to determine was whether the Salinas family, as the lessor, had standing to sue in tres-

\begin{footnotes}
\item[88.] Id.
\item[89.] Id. at 7.
\item[90.] Id. at 7-8.
\item[91.] Mark E. Vandermeulen, \textit{The Texas Supreme Court Holds Hydraulic Fracturing Trespass Claim is Precluded By the Rule of Capture}, 62 SMU L. REV. 835, 836 (2009) (describing the effective length as “the area in which the natural gas production is stimulated”).
\item[92.] \textit{Garza}, 268 S.W.3d at 7-8.
\item[93.] Id. at 8.
\item[94.] Id. at 8-9.
\item[95.] Id. at 1-2.
\item[96.] Id. at 1.
\item[97.] \textit{Garza}, 268 S.W.3d at 8.
\item[98.] Id. at 9.
\item[99.] Id. at 5.
\end{footnotes}
pass.100 The court began by distinguishing between trespass *quare clausum fugit*101 and trespass on the case.102 The court noted that because trespass *quare clausum fugit* required a physical trespass upon a possessory interest in land, an interest that Salinas did not possess, this action would be considered under the theory of trespass on the case.103 As a mineral lessor, “Salinas ha[d] only ‘a royalty interest and the possibility of reverter’ should the leases terminate, but ‘no right to possess, explore for, or produce the minerals.’”104 As such, Salinas needed to demonstrate actual harm to his property, rather than just proving that a physical invasion occurred.105

The court then quickly reviewed the *Delhi-Taylor* case, limiting its analysis to the issue of jurisdiction, and noted that Texas courts possessed the authority to make a determination on a claim of trespass due to hydraulic fracturing activities.106 The court also acknowledged its holding in *Geo Viking* that hydraulic fracking beneath another’s land could be an actionable trespass claim, but subsequently noted that the opinion had been withdrawn with the express statement that the issue had not been resolved by the court.107

The majority explicitly declined to decide the general issue of whether hydraulic fracturing could constitute a trespass; and instead, held that the rule of capture precludes trespass claims where the only injury asserted is the drainage of hydrocarbons.108 Essentially, the court found that the rule of capture shielded Coastal from liability for a drainage of hydrocarbons, and therefore, that Coastal rightfully obtained any oil and gas produced by its well on Share 12.109 The court

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100. *Id.* at 9.
101. “Trespass quare clausum fugit. At common law, an action to recover damages resulting from another's unlawful entry on one's land...” BLACK'S LAW DICTIONARY 1542 (9th ed. 2009).
102. “Trespass on the case. At common law, an action to recover damages that are not the immediate result of a wrongful act but rather a later consequence. This action was the precursor to a variety of modern-day tort claims, including negligence, nuisance, and business torts.” *Id.*
104. *Id.* at 9.
105. *Id.* at 10.
106. *Id.* at 12.
107. *Id.*
109. *Id.* at 13.
quickly addressed and dismissed Salinas’ claim that hydraulic fracturing activities were analogous to a deviated well by noting that:

[T]he rule of capture determines title to gas that drains from property owned by one person onto property owned by another. It says nothing about the ownership of gas that has remained in place. The gas produced through a deviated well does not migrate to the wellbore from another’s property; it is already on another’s property.\textsuperscript{110}

Thus, the court found that no injury occurred to Salinas because the gas under Share 13 “simply did not belong to [him].”\textsuperscript{111} The court articulated four reasons why the rule of capture should preclude trespass claims where the only injury asserted is drainage of hydrocarbons.\textsuperscript{112} First, plaintiffs will have had full recourse available to them under the law, since the plaintiffs had the option of drilling a well on their property to offset the drainage from another well. Furthermore, the lessee operator has a duty to conduct its operations as would a reasonably prudent operator. As such, the owner may protect his or her interests by suing the lessee for a breach of implied covenant.\textsuperscript{113} Nevertheless, if these measures fail, the court noted that the plaintiffs may opt to appeal to the Railroad Commission to force the draining party to pool.\textsuperscript{114}

Second, the court reasoned that the Railroad Commission is in the best position to determine whether to regulate oil and gas production, and that the rule of capture “makes it possible for the Commission . . . to protect the correlative rights of owners with the interests in the same mineral deposit while securing the ‘state’s goals of preventing waste and conserving natural resources.’”\textsuperscript{115} Third, the court found that it was ill-equipped to undertake an analysis of damages from drainage as the proof is often buried “below miles of rock, making it

\textsuperscript{110} Id. at 14.
\textsuperscript{111} Id.
\textsuperscript{112} Id.
\textsuperscript{113} Garza, 268 S.W.3d at 14.
\textsuperscript{114} Id. The term “pooling” is defined as “[t]he bringing together of small tracts of land or fractional mineral interests over a producing reservoir for the purpose of drilling an oil or gas well.” BLACK'S LAW DICTIONARY at 1279. The term “compulsory pooling” refers to “[p]ooling done by order of regulatory agency. – Also termed forced pooling.” Id.
\textsuperscript{115} Garza, 268 S.W.3d at 15 (quoting Gulf Land Co. v. Atlantic Ref. Co., 131 S.W.2d 73, 80 (Tex. 1939)).
difficult to ascertain what might have happened.”

Fourth, the court cited the numerous amicus briefs that were filed “from every corner of the industry,” who all strongly opposed liability for hydraulic fracturing. However, before concluding the opinion, the court notably limited its holding by stating that other conduct, unrelated to the rule of capture, may provide a cause of action for a subsurface trespass claim.

Justice Don Willett wrote a concurring opinion, and proposed that hydraulic fracturing beyond property boundaries should never constitute trespass. Justice Willett relied heavily upon the Supreme Court of Texas’ ruling in Railroad Commission of Texas v. Manziel to support his position, characterizing the Manziel decision as holding that water flooding was not a trespass. However, it is important to remember that while the Texas Supreme Court in Manziel did discuss trespass in dicta, the Manziel decision did not involve a tort against a trespassing party. Rather Manziel was a suit against the Railroad Commission to set aside an administrative order. In addition, Justice Willett voiced further concerns that the oil and gas industry’s ability to extract hydrocarbons from geological formations, which requires hydraulic fracturing, would be impeded if not significantly crippled where such hydraulic fracturing operations could lead to trespass liability. Justice Willett concluded his opinion by stating that adequate alternative remedies are available for such plaintiffs.

Justice Phil Johnson, joined by Justice Wallace Jefferson, and by Justice Miguel Medina as to Part I, wrote a separate opinion concurring in part and dissenting in part with the majority opinion. Justice Johnson argued that because the rule of capture is only applicable when the oil and gas is extracted legally, the issue of whether the

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116. Id. at 16.
117. Id. at 16-17.
118. Id. at 17.
119. Id. at 29 (Willett, J., concurring).
120. Garza, 268 S.W.3d at 35-37 (Willett, J., concurring) (citing Manziel, 361 S.W.2d 560).
121. Id. at 12 (majority opinion).
122. Id. at 31-32 (Willett, J., concurring).
123. Id. at 30.
124. Id. at 41 (Johnson, Jefferson & Medina, JJ., concurring in part and dissenting in part).
fracking activities constituted a trespass must be determined first. He stated that if the fracking across property boundaries constitutes a trespass, then the rule of capture will not apply due to the illegality of the procedure.

In particular, the dissenters were concerned that the majority’s holding “reduce[d] incentives for operators to lease from small property owners because they can drill and hydraulically fracture to ‘capture’ minerals from unleased and unpooled properties that would otherwise not be captured.” In other words, the dissenters worried that under the majority’s ruling natural gas companies could extend the boundaries of their lease and thereby recover gas from neighboring small landowners’ properties without having to compensate the landowner. This practical concern was grounded in the dissent’s comparison of a hydraulically fracked well to a deviated well: “Both simply provide the means for gas to flow to an area of lower pressure and from there to the drilling operator’s property where it is captured.”

The court quoted Terry Ragsdale’s article, Hydraulic Fracturing: The Stealthy Subsurface Trespass, when making this comparison, noting that “‘[f]rom both a functional and physical perspective, a hydraulic fracture is largely analogous to a directionally drilled well.’”

Despite the rigorous arguments made in the dissent, Garza remains the leading authority on the issue of subsurface trespass. The Texas Supreme Court had the luxury of hearing a number of relevant cases related to hydraulic fracturing to help it make an informed decision. While Pennsylvania courts have the foundation to construct an informed opinion on this issue, Pennsylvania courts lack the same degree of judicial familiarity with these issues as the courts in other major oil and gas producing jurisdictions.

V. Pennsylvania Case Law and Related Court Decisions From Gas Producing Jurisdictions

125. Garza, 268 S.W.3d at 42-43 (Johnson, Jefferson & Medina, JJ., concurring in part and dissenting in part).
126. Id. at 43-44
127. Id. at 45.
128. Id. at 44.
129. Id.
130. Garza, 268 S.W.3d at 44 (Johnson, Jefferson & Medina, JJ., concurring in part and dissenting in part) (quoting Ragsdale, supra note 45, at 319).
Despite the rapid outburst of hydraulic fracture drilling in Pennsylvania, no court in the state has yet addressed the issue of subsurface trespass related to these drilling activities. In light of the rapid increase in well permit applications in the last several years, it is likely that such subsurface trespass issues will arise in Pennsylvania with increasing frequency. The Berish case, pending before the District Court for the Middle District of Pennsylvania, is one such case and likely not the last. Although the Texas Supreme Court in the Garza case is the only court to have directly considered the issue of subsurface trespass from hydraulic fracturing activities, below is a review of potentially relevant case law in Pennsylvania, as well as a collection of cases from other gas producing jurisdictions that have addressed analogous issues.

A. Pennsylvania Case Law

Under Pennsylvania law, an individual may be subject to liability for trespass, if the individual intentionally enters land in the possession of another or causes a thing or a third person to do so, remains on the land, or fails to remove a thing which one is under a duty to remove. While there is very little case law in Pennsylvania involving trespass in the context of natural gas and oil drilling activities, the Pennsylvania state courts have acknowledged that a claim of trespass for subsurface migration of fluids exists and is actionable. In cases where a trespass involving property contamination has been alleged, courts in Pennsylvania have distinguished whether the trespass was “continuing” or “permanent” in nature, as each has important legal implications.

For instance, in Dombrowski v. Gould Electronics, Inc., the District Court for the Middle District of Pennsylvania stated in dicta that the subsurface migration of pollutants constituted a trespass. The de-
fendants in the *Dombrowski* case had operated a battery crushing and lead processing plant located in a residential neighborhood.\(^ {137}\) The plaintiffs, who were present and former residents of a nearby borough, alleged that the site had become “contaminated with lead and other hazardous materials, and . . . by means of leakage, seepage, runoff, emission and/or erosion had contaminated the surrounding air and groundwater, as well as the soil of the neighboring residences.”\(^ {138}\)

Although the plaintiffs’ trespass claim ultimately was barred by the statute of limitations, the majority affirmatively stated that “[t]here [was] no doubt in the Court’s mind that [this was] a permanent trespass.”\(^ {139}\) Furthermore, the court stated that “invasions such as water well contamination, waste dumping, soil contamination from underground storage tanks and coal removal and subsidence therefrom have all been said to have created a permanent change in the land so as to constitute a permanent trespass.”\(^ {140}\)

Pennsylvania courts have adopted the sections of the Restatement (Second) of Torts that deal with continuing and permanent environmental trespass.\(^ {141}\) If the invasion or trespass is categorized as a continuing trespass, then the landowner has the option of bringing successive actions.\(^ {142}\) The Restatement (Second) of Torts defines a continuing trespass as follows:

*Continuing trespass.* The actor's failure to remove from land in the possession of another a structure, chattel, or other thing which he has tortiously erected or placed on the land constitutes a continuing trespass for the entire time during which the thing is wrongfully on the land and . . . confers on the possessor of the land an option to maintain a succession of actions based on the theory of continuing trespass or to treat the continuance of the thing on the land as aggravation of the original trespass.\(^ {143}\)

\(^{137}\) *Id.* at 1008.

\(^{138}\) *Id.*

\(^{139}\) *Dombrowski*, 954 F. Supp. at 1013.


\(^{142}\) *Dombrowski*, 954 F. Supp. at 1013.

\(^{143}\) RESTATEMENT (SECOND) OF TORTS § 161 cmt. b.
On the other hand, if the invasion or trespass is categorized as permanent, then the landowner only has one cause of action. The Restatement (Second) of Torts distinguishes a continuing trespass from a permanent injury as follows:

_Effect of a permanent change in the condition of the land._ A continuing trespass must be distinguished from a trespass which permanently changes the physical condition of the land. Thus, if one, without a privilege to do so, enters land of which another is in possession and destroys or removes a structure standing upon the land, or digs a well or makes some other excavation, or removes earth or some other substance from the land, the fact that the harm thus occasioned on the land is a continuing harm does not subject the actor to liability for a continuing trespass. Since his conduct has once for all produced a permanent injury to the land, the possessor's right is to full redress in a single action for the trespass, and a subsequent transferee of the land, as such, acquires no cause of action for the alteration of the condition of the land.

Under Pennsylvania law, the difference concerns whether the injury results in a permanent change to the condition of the land or if the action concerns discreet recurring injuries, which cannot be brought in a single action. This step is significant because whether the statute of limitations tolls will turn on whether the injuries are of a permanent nature, or can be characterized as separate and recurrent injuries. In Pennsylvania, actions for trespass and nuisance must be commenced within two years of the action. If a trespass at the time of creation is a permanent one, “there can be but a single action . . . to recover past and future damages and the statute of limitations runs against such cause of action from the time it first occurred.” Alternatively, if the activity constitutes a continuing trespass, it provides a right to recovery for an injury that occurred during the continuance of the al-

144. _Id._ § 162 cmt. e.
145. _Id._
leged trespassing action and is maintained until the commencement of legal action.\textsuperscript{150}

The apparent harshness of this rule to plaintiffs is somewhat mitigated by the “discovery rule” in Pennsylvania. The discovery rule protects potential plaintiffs by tolling the statute of limitations in instances where plaintiffs were uncertain of their injury and could not have reasonably known about it earlier.\textsuperscript{151} Plaintiffs are expected to use all reasonable diligence to be properly informed to the extent that “a claimant's failure to make [the] proper inquiries[, will] constitute[ a] failure to exercise reasonable diligence as a matter of law.”\textsuperscript{152}

In addition to addressing environmental trespass issues, the Pennsylvania Superior Court has contemplated the use of technology in hydrocarbon resource extraction with respect to the rule of capture. In \textit{Jones v. Forest Oil Co.}, a suit was filed for the purpose of restraining the defendant by injunction from using what is known as a “gas pump” for pumping oil from one of its wells.\textsuperscript{153} The Pennsylvania Superior Court suggested that “an owner of oil wells may use mechanical devices for bringing the oil to the surface,” even if it decreases production on a neighboring property.\textsuperscript{154} In \textit{Westmoreland & Cambria Natural Gas Co. v. De Witt}, the Supreme Court of Pennsylvania quoted a case from 1875 saying, “[p]ossession of the land . . . is not necessarily possession of the gas. If an adjoining or even a distant owner drills his own land and taps your gas, so that it comes into his well and under his control, it is no longer yours, but his.”\textsuperscript{155} This affirmation of the rule of capture may lead those who are extracting natural gas to argue that a hydraulic fracture is no different from the “mechanical device” described in \textit{Forest Oil}, since both allow for the migration of fluids from one property to another. Alternatively, an argument similar to the dissent in \textit{Garza}, could be made that the fracture is no different from a wellbore and therefore such an intrusion would be considered a trespass.

\textsuperscript{150} \textit{Id.}
\textsuperscript{153} 44 A. 1074, 1075 (Pa. 1900).
\textsuperscript{154} \textit{Id.}
\textsuperscript{155} 18 A. 724, 725 (Pa. 1889) (quoting \textit{Brown v. Vandergrift}, 80 Pa. 142 (1875)).
The Pennsylvania Supreme Court in *U.S. Steel Corp. v. Hoge*, while addressing a question concerning ownership of coal bed gas, indirectly reached a related trespass issue. U.S. Steel had owned the subsurface rights to the coal beneath a property through a severance deed. Hoge, however, retained the right to drill and operate through the coal seam for any oil and gas located below the seam. U.S. Steel learned that Hoge had begun drilling for coal bed gas in the coal seam and brought an action for trespass arguing that it owned the coal bed gas in the coal seam. The court found that the gas, which was chemically bonded to the coal, must “necessarily belong to the owner of the coal.”

Article VIII. The decision in *Hoge*, left open the question as to whether mineral rights owners, who choose to hydraulically fracture their property to extract coal bed gas, may extend fractures into neighboring coal bed property without being liable for a subsurface trespass. The court suggested that doing so could constitute a trespass, because the gas is owned by the person who owns the coal.

One important statute regarding liability for natural gas operators is the Pennsylvania Oil and Gas Act. Specifically, § 601.208 provides that “[a]ny well operator who affects a public or private water supply by pollution or diminution shall restore or replace the affected supply with an alternate source of water adequate in quantity or quality for the purposes served by the supply.” The statute thus provides a rebuttable presumption of liability for operators who drill within 1,000 feet of a water supply.

### B. Case Law From Other Natural Gas Producing Jurisdictions

Pennsylvania, unlike Texas, has not addressed whether hydraulic fracturing activities can result in a trespass claim. Due to Pennsylvan-
nia’s relatively limited experience with well drilling activities, the
courts have not addressed most of the related well drilling activities
that could provide it with some guidance in addressing a subsurface
trespass claim as a result of hydraulic fracturing activities. Below is a
discussion of how other gas producing jurisdictions have addressed
similar issues, including: deviated wells, secondary recovery opera-
tions, water disposal activities, subsurface storage reservoirs, and oth-
er case law related to the subsurface migration of fluids. It is possible
that Pennsylvania courts, including cases such as Berish, would look
to these jurisdictions for assistance when confronted with a subsurface
trespass claim.

1. Deviated Wells

   The clearest example of an actionable subsurface trespass is the
drilling of a well that bottoms out beneath an adjacent property. All
jurisdictions that have contemplated this issue agree that no one has a
right, by ownership of surface rights above a gas or oil producing
formation, to extend a wellbore beyond the boundaries of their own
property, so as to trespass upon the premises of adjoining owners. The
rule of capture does not apply in this situation because the hydro-
carbons do not migrate, but rather remain in place. As such, the
rightful owner of the hydrocarbons does not have the self-help remedy
of drilling his own well to offset the drainage.

   The ability to offset costs depends on whether the hydrocarbon pro-
duction was economically beneficial to the legal owner of the re-
sources. In Edwards v. Lachman, defendant Lachman’s deviated
well bottomed and produced hydrocarbons from a formation that was
under plaintiff Edwards’ adjacent property. The defendant’s devi-
ated well was at a greater depth than the only well on the plaintiff’s
property. At first Lachman was unaware that his well had deviated,
but after learning that it had, he remained silent and kept producing

165. See, e.g., Nunez v. Wainoco Oil & Gas Co., 488 So.2d 955, 964 (La. 1986);
Kysar v. Amoco Prod. Co., 93 P.3d 1272 (N.M. 2004); Edwards v. Lachman, 534
167. Lachman, 534 P.2d at 674.
168. Id. at 674-75.
169. Id. at 675.
170. Id. at 674-75.
171. Id. at 672.
from the formation. Here the Supreme Court of Oklahoma held that to the extent that drilling and completion of the well benefited the plaintiffs, the defendants were entitled to credit for drilling and completion costs prior to the time defendants obtained a directional survey disclosing that their well was bottomed in plaintiffs' adjacent property. To determine if a benefit had been conferred by the trespass drilling, the court looked to see if defendants produced from formations not drilled by the plaintiff, and also, what costs the plaintiff forewent as a result of defendant’s actions.

Deviated wells most closely analogize with horizontal wells that deviate into another’s property. In such a scenario it is reasonable that any court would find such a horizontal well to be trespassing. A similar, but weaker, analogy can be made comparing a deviated well and hydraulic fractures or fluid that may migrate onto another’s property. The Texas Supreme Court in Garza argued that these were distinguishable activities. However, an argument can be made that functionally, deviated wells perform similar to that of a hydraulically fractured well.

2. Secondary Recovery Operations

In secondary recovery operations, operators pump fluids into an existing well, which “sweep” hydrocarbons toward producing wells to recover oil or gas reserves that were unattainable during primary recovery. When the fluids migrate into the subsurface property of another, however, trespass issues can arise. In subsurface trespass claims resulting from secondary recovery operations the decision often turned on proof of actual harm.

The Fourth District Court of Appeals of California in Cassinos v. Union Oil Company of California, however, found a trespass claim actionable on very similar facts. In Cassinos, the plaintiff claimed that a trespass had occurred when an adjacent landowner injected off-
site wastewater into the plaintiff’s mineral estate.\textsuperscript{179} Here the defendant’s injection of secondary recovery fluids had damaged the plaintiff’s ability to drill for oil and gas and to extract other minerals under its lease.\textsuperscript{180} The court found substantial evidence had existed to support the trial court’s decision that Union’s “injection of wastewater interfered with and damaged wells” in the plaintiff’s mineral estate and therefore constituted a trespass.\textsuperscript{181} Specifically, the court held that “causing subsurface migration of fluids into a mineral estate without consent constitutes a trespass.”\textsuperscript{182}

In Oklahoma, facts like those in \textit{Cassinos} give rise to a cause of action for private nuisance rather than trespass. In \textit{Greyhound Leasing & Financial Corp. v. Joiner City Unit}, the United States Court of Appeals for the Tenth Circuit held that a landowner could bring an action in private nuisance to recover for damages caused by a secondary recovery operation.\textsuperscript{183} In \textit{Greyhound}, the defendant had begun injecting water at points about one mile from the plaintiff’s nearest lease.\textsuperscript{184} The injected water reached the plaintiff’s wells, resulting in over $500,000 in permanent damage to the wells.\textsuperscript{185} The court in \textit{Greyhound} rejected the defendant’s public policy argument that the common law should not encroach upon an industry regulated by a state regulatory Commission, an argument that the Texas Supreme Court accepted in \textit{Garza}.\textsuperscript{186}

In \textit{Jameson v. Ethyl Corp.}, the defendant, Ethyl Corp., owned a series of subsurface property leases for the purpose of commercially extracting bromide ions from a brine formation of about 15,000 acres.\textsuperscript{187} Jameson owned a ninety-five acre tract of land located within this formation, but neither his land nor subsurface rights were

\begin{itemize}
  \item \textsuperscript{179} \textit{id.} at 575-76.
  \item \textsuperscript{180} \textit{id.} at 582.
  \item \textsuperscript{181} \textit{id.} at 579-80. The plaintiff’s lease experienced a sudden drop in oil production in its well and in its other wells after the defendant began to inject the wastewater into its well. \textit{Cassinos}, 18 Cal. Rptr. 2d at 583-585. Later, after the defendant stopped injecting the wastewater into its well, oil production increased in the plaintiff’s wells. \textit{id.}
  \item \textsuperscript{182} \textit{id.} at 578.
  \item \textsuperscript{183} 444 F.2d 439 (10th Cir. 1971).
  \item \textsuperscript{184} \textit{id.} at 440.
  \item \textsuperscript{185} \textit{id.}
  \item \textsuperscript{186} \textit{id.} at 442.
  \item \textsuperscript{187} 609 S.W.2d 346, 346 (Ark. 1980).
\end{itemize}
leased to Ethyl Corp.\textsuperscript{188} In order to commercially extract the bromide ions from the formation, Ethyl Corp. needed to perform a secondary recovery operation where the bromine content underneath Jameson’s land was substantially reduced.\textsuperscript{189}

The Supreme Court of Arkansas in \textit{Jameson} recognized that “transient minerals such as oil, gas, and brine will be wasted if a single landowner is able to thwart secondary recovery processes, while conversely acknowledging a need to protect each landowner’s rights to some equitable portion of pools of such minerals.”\textsuperscript{190} Similar to the dissent in \textit{Garza}, the court in \textit{Jameson} found that if the rule of capture applied to the present situation, it had the potential to “unnecessarily extend the license of mineral extraction companies . . . and, in any event, further extend the bargaining power of such entities to reduce royalty payments to landowners who are financially unable to[.].”\textsuperscript{191} To balance these considerations, the court permitted the good-faith recovery process to proceed, conditioned by the “imposition of an obligation on the extracting party to compensate the owner of the depleted lands for the minerals extracted in excess of natural depletion, if any, at the time of taking and for any special damages which may have been caused to the depleted property.”\textsuperscript{192}

These secondary recovery operations cases illustrate that some courts have been willing to accept trespass claims where damage occurred to a neighboring property. However, may not treat hydraulic fracturing cases the same way. One significant way that hydraulic fracturing activities differ from secondary recovery operations is that fluids used in a hydraulic fracturing activity are potentially much more toxic than the materials used in most secondary recovery operations.\textsuperscript{193}

3. \textit{Water Disposal Activities}

Courts from Oklahoma, Texas, and Ohio have all considered the issue of whether water disposal activities can give rise to a claim of

\begin{itemize}
\item \textsuperscript{188} \textit{Id.} at 346-47.
\item \textsuperscript{189} \textit{Id.} at 349.
\item \textsuperscript{190} \textit{Id.} at 351.
\item \textsuperscript{191} \textit{Id.}
\item \textsuperscript{192} \textit{Jameson}, 609 S.W.2d at 351.
\item \textsuperscript{193} \textit{SUMI}, \textit{supra} note 9, at 9-10, 13.
\end{itemize}
trespass and a right to damages. These cases usually involve the injection of wastewater, a necessary byproduct of drilling activities, several thousand feet below the surface. Generally, these cases have demonstrated that in gas producing jurisdictions the respective courts have been reluctant to find a trespass, unless the plaintiff can demonstrate actual damage to his or her property.

In *FPL Farming, Limited v. Texas Natural Resource Conservation Commission*, the state regulatory body had issued permits to “inject commercial, nonhazardous industrial waste approximately 7,350 to 8,200 feet below the surface.” Once nearby landowners became aware that the waste would migrate underneath their lands over a thirty-year period, they filed a suit against the regulatory body. The Court of Appeals of Texas deferred to the agency’s expertise, which downplayed the risks concerning the geological effects of the migration of the waste, the agency found that the “injection wells would be in the public interest, that no existing rights would be impaired, and that fresh water would be properly protected from pollution.” The court determined that if actual damages were later established, however, the surface owners would be able to seek compensation from the injecting party.

The same plaintiffs filed a separate lawsuit, alleging that they could demonstrate damages from a subsurface trespass. Here, the court concluded that “when a state agency has authorized deep subsurface injections, no trespass occurs,” even when fluids that were injected are then “alleged to have later migrated at those deep levels into the deep subsurface of nearby tracts.”

In the class action suit *Chance v. BP Chemicals Inc.*, the plaintiff class claimed that BP Chemicals had injected waste underneath BP

197. 2003 WL 247183 at *1.
198. *Id.* at *2.
199. *Id.* at *4.
200. *Id.* at *5.
201. *Id.* at **2-3.
property for storage, which “laterally migrated to be below the surface of plaintiffs’ properties and that the migration violated their rights as property owners.”

The majority in *Chance* first distinguished this situation from that of a secondary recovery operation. Because BP Chemical’s “injection well operation ha[d] nothing to do with the extraction or storage of oil or gas,” it was not shielded by the negative rule of capture, which states that a land owner may inject substances into a formation which may migrate through the structure to the land of others.

The court in *Chance* then articulated the position that “[j]ust as a property owner must accept some limitations on the ownership rights extending above the surface of the property, . . . there are also limitations on property owners' subsurface rights.” Assuming that the fluid did migrate underneath the appellants’ properties, the court stated that appellants still need to show that the migration “actually interfer[ed] with the appellants' reasonable and foreseeable use of the subsurface.”

The appellants further argued that the trial court should have allowed them to present evidence that “environmental stigma associated with the deepwells had a negative effect on appellants' property values due to the public perception that there may have been injectate under appellants' properties and that the injectate may be dangerous.” However, the court found that the Eighth District Court of Appeals, did not abuse its discretion in its foreclosing appellants from presenting evidence of speculative stigma damages.

Despite the recurring theme that actual damages must be established for an actionable trespass claim, the New Mexico Supreme Court in *Snyder Ranches v. Oil Conservation Commission*, may have suggested otherwise. In this case, plaintiffs filed an application with the New Mexico’s Natural Resource Department for a permit to inject salt water through a disposal well into an underground formation. The court ultimately found that the salt water disposal activities would not
necessarily result in a trespass. The court noted, however, that the license that was granted did “not authorize a trespass” and did not “immunize the licensee from liability for negligence or nuisance which [might] flow[] from the licensed activity.” Conspicuously absent from the court’s language was any requirement for actual damages to be established in order for such a trespass claim to be actionable.

Due to the different geologic formations in Pennsylvania and Texas, operators in Pennsylvania are not able to dispose of wastewater into the ground the same way that it can be done in Texas. As such, there is no case law in Pennsylvania dealing with this issue. Nonetheless, a Pennsylvania court could still look to a case such as Snyder to support the notion that hydraulic fracturing can constitute a trespass without the need to demonstrate harm. Additionally, the cases of FPL Farming and Chance, taken together, support the notion that if actual damages are established from hydraulic fracturing activities, then a trespass claim may be actionable; however, those damages may not take the form of “environmental stigma.”

4. Subsurface Gas Storage Reservoirs

Natural gas and carbon dioxide are commonly stored by way of injection into subsurface formations. A variety of formations, including depleted reservoirs in oil or gas fields, salt cavern formations, and aquifers, all have the ability to store natural gas or carbon dioxide. However, trespass issues can arise when the stored gas migrates across boundary lines into adjacent properties.

212. Id. at 589-90.
213. Id.
215. See Snyder, 798 P.2d 587.
216. See FPL Farming, 2003 WL 247183.
219. Id. at 136-37.
In *Lone Star Gas Co. v. Murchison*, the Court of Civil Appeals of Texas, Dallas, found that when natural gas is injected into a formation for storage purposes it remains the property of the party that injected it, and therefore, it is not subject to capture if the gas migrates across property boundaries.\(^\text{220}\) In this case, Lone Star had acquired the right to store gas in a particular subsurface formation, but the gas leaked onto a nearby property belonging to the plaintiff.\(^\text{221}\) This case did not squarely address the issue of trespass. Instead, the question before the court was who had the right to the gas underneath Murchison’s property.\(^\text{222}\) Generally, courts have found that “due to the strong public policies” promoting such operations and good faith storage, they are reluctant to find liability for this type of potential subsurface trespass.\(^\text{223}\) In particular, subsurface natural gas storage facilities are seen to prevent the economic waste of being forced to build bigger pipelines and extremely expensive man-made storage facilities.\(^\text{224}\)

In *ANR Pipeline Co. v. 60 Acres of Land*, however, ANR Pipeline operated a gas storage field and brought a condemnation action against an adjacent landowner, seeking to acquire subsurface strata and formations for the storage of natural gas.\(^\text{225}\) After recognizing the principle articulated in *Lone Star*, the District Court of the Western District of Michigan stated that, while the plaintiffs “do not claim a trespass by extraneous gas” if that injected gas “moves across boundaries there may be a trespass.”\(^\text{226}\) While this statement was made in dicta, it leaves the door open for a subsurface trespass claim with no mention by the court of a need to establish harm.

5. *Other Subsurface Liability Case Law*

Another set of trespass cases that provide a useful analogy to a trespass via hydraulic fracturing activities are those involving the migration of subsurface toxic fluids. The toxic, and often carcinogenic, na-
ture of the substances that migrate in these cases are the defining element that factually separate them from secondary recovery activities, water disposal operations, and gas storage reservoirs.

While in Pennsylvania the cases of Dombrowski and Degussa have established that Pennsylvania courts acknowledge that subsurface environmental contamination is an actionable “permanent” trespass, there also exists a competing line of cases which recognize environmental contamination as a “continuing” trespass. It is possible that a new fact pattern emanating from hydraulic fracturing activities will more closely align with cases in which other jurisdictions have found subsurface contamination to be a continuing trespass, therefore giving rise to repeating causes of action and tolling the statute of limitations.

In Hoery v. United States, the United States owned and operated the Lowry Air Force Base in Colorado between the 1940s and 1994. 227 During this time period, the base was used to dispose of trichloroethylene (“TCE”) and other toxic chemicals. 228 The release of these chemicals created plumes of toxic pollution underneath Lowry and extended several miles north under Hoery’s property. 229 The United States Air Force tested a well on Hoery’s property and found that it was contaminated with TCE. 230 The Colorado Supreme Court found that the government’s failure to remove the chemicals that were placed on the plaintiff’s land was considered a “continuing trespass” for the entire time during which the chemicals remained on the land. 231 The court expressly rejected the government’s argument that its wrongful conduct had ceased in 1994 and that the contamination of Hoery’s property represented only the product of that past prior conduct. 232 Importantly, the court found that the contamination was “remediable” and or “abatable” and therefore would not necessarily have to continue indefinitely. 233 A number of other jurisdictions have followed this line of logic, recognizing contamination from the migration of chemicals to constitute a continuing tort. 234

227. 64 P.3d 214, 216 (Colo. 2003).
228. Id.
229. Id.
230. Id.
231. Id. at 215.
232. Hoery, 64 P.3d at 222.
233. Id. at 222-23.
234. See, e.g., Nieman v. NLO, Inc., 108 F.3d 1546, 1556-57 (6th Cir. 1997) (Although discharge of uranium was years ago, plaintiff may bring claim for resulting contamination to his land. However, plaintiff can only recover for damages suffered
A significant problem that faces potential plaintiffs alleging subsurface trespass for the migration of toxic chemicals is that of causation due to the fugacious nature of underground fluids, the potential for more than one point source to have been the source of contamination, and the resulting difficulty in establishing a single cause of injury. For example, in Phillips v. Sun Oil Corp. a heavy concentration of gasoline was found in a well supplying water to plaintiff’s building, and a chemist gave his opinion that the gasoline was of the brand dispensed from defendant’s pumps and tank, which were about seventy five feet from plaintiff’s well. The plaintiffs, among other things, alleged subsurface trespass of toxic fluids. The Court of Appeals of New York, however, affirmed a judgment in favor of the oil company, finding that there was no showing as to how the fluid found its subterranean way from the company’s property to the plaintiff’s premises.

One legal theory which may be alluring to plaintiffs is that of “Toxic Trespass,” because of its potential to alleviate the need to demonstrate harm. This theory may be appealing to those alleging trespass due to the migration of hydraulic fracturing fluids. For example, in the case of Yommer v. McKenzie, the Court of Appeals for Maryland found that the offsite migration of toxic fluids triggered strict liability for ultra-hazardous activities. Here, the plaintiffs lived on a property where they used a well to gather water, which was directly adjacent to a grocery store and gasoline filling station operated by the defendants. The plaintiffs argued that the operation of the gasoline filling station led to the contamination of his well with gas...

236. 121 N.E.2d 249 (N.Y. 1954).
237. Id.
238. Id.
239. Christopher R. Reeves, Climate Change on Trial: Making the Case for Causation, 32 AM. J. TRIAL ADVOC. 495, 523 (2009).
240. Id.
242. Id. at 138-39.
line, causing the plaintiffs to be forced to get their drinking water from over a mile away.\textsuperscript{243} The court found that “[a]lthough the operation of a gasoline station does not of itself involve ‘a high degree of risk of some harm to the person, land or chattels of others,’ the placing of a large underground gasoline tank in close proximity to the appellees’ residence and well does involve such a risk.”\textsuperscript{244} The court found that the activity fit within the definition of an “abnormally dangerous activity,” and that the most crucial factor was the “appropriateness of the activity in the particular place where it is being carried on.”\textsuperscript{245} Abnormally dangerous activities by definition create a significant risk of serious harm even when reasonable care is used.\textsuperscript{246} The court found that the operation of the gasoline refilling station required the placing of a large tank “adjacent to a well from which a family must draw its water for drinking, bathing and laundry, at least that aspect the activity is inappropriate to the locale,” even though reasonable precautions were taken.\textsuperscript{247} It is important to consider, however, that while this theory may remove the hurdle for plaintiffs of having to demonstrate actual harm, it erects another by requiring plaintiffs to show that the activity is ultra-hazardous.

VI. Analysis

Pennsylvania should not follow the Garza decision and should instead recognize trespass from hydraulic fracturing activities as an actionable claim without the need to demonstrate harm. In the alternative, at the very least, trespass from hydraulic fracturing activities should be an actionable trespass claim if the plaintiff can demonstrate actual damage/harm. The Supreme Court in Texas decided the Garza case wrongly, both as a matter of common law and as a matter of public policy. Even operating under the assumption that Garza was decided correctly, it is a limited case with narrow, if any, applicability in Pennsylvania.

A. Critique of the Texas Supreme Court’s Decision in Garza

\textsuperscript{243} Id.
\textsuperscript{244} Id. at 140.
\textsuperscript{245} Id.
\textsuperscript{246} Yommer, 257 A.2d at 140.
\textsuperscript{247} Id.
Pennsylvania courts should not treat Garza as persuasive authority because both the logic and reasoning employed by the majority do not support their overall conclusion that hydraulic fracturing activities do not constitute an actionable trespass claim when the only damage claimed is drainage. That being said, even if the arguments made by the majority are followed, they will have limited effect because they are couched in terms that render the case, at most, a narrow decision.

The majority’s argument that the rule of capture precludes Salinas’s trespass claim is problematic. The dissent makes a salient counter-argument, stating that a determination first needs to be made as to the legality of Coastal’s drainage operations. If the gas was extracted illegally by Coastal, the rule of capture does not apply. Therefore, the dissent reasons that the majority needs to first addresses the trespass issue. This identifies an internal inconsistency in the majority’s argument because they explicitly leave open the possibility that a trespass claim for damages other than drainage could be successful, and thus implicitly recognize that hydraulic fracturing activities can constitute a trespass. A fundamental difference in approach between the majority and the dissent can be seen here. While the majority wrongly sees the nature of the injury as the determining factor in evaluating the legality of the defendant’s actions, the dissent properly argues that the nature of the extraction should decide legality.

Furthermore, the majority misconstrues the comparison of hydraulic fracturing activities to deviated wells. As noted earlier, directionally drilled wells that cross property boundaries have been universally recognized as constituting trespass. The dissent argues that the same logic should apply to hydraulic fracturing activities, observing that the differences between a deviated well and a hydraulic fracturing operation are in fact negligible. In both activities a lease operator intentionally inserts foreign material (i.e. the fracturing fluid) without permission into a another’s property, drains hydrocarbons via the inserted foreign material, and then proceeds to capture the hydrocarbons upon arrival at his/her property. There is little practical difference between a five inch diameter wellbore and that of an artificially created

248. Garza, 268 S.W.3d at 42-43.
249. Id. at 44.
250. Id. at 14.
251. See, e.g., Alphonzo E. Bell Corp., 76 P.2d 167.
252. Garza, 268 S.W.3d at 44.
253. Id.
fracture; both serve the same purpose. The dissent specifically cites *Hydraulic Fracturing: The Stealthy Subsurface Trespass*, which states that “[f]rom both a functional and physical perspective, a hydraulic fracture is largely analogous to a directionally drilled well.”

Additionally, the majority’s reasoning mischaracterizes how the rule of capture governs the unnatural migration of fluids. In response to Salinas’ argument that the rule of capture should not apply where the migration of fluids occur due to unnatural intervention, the court conjures up three strawmen and then dismisses each of them in turn. The court first suggests that if by “unnatural” Salinas means “due to human intervention, the simple answer is that such activity is the very basis for the rule, not a reason to suspend its application.” Second, the majority proposes that if Salinas means to equate unnatural to “unusual” this is not correct as these activities have been long used throughout the industry for the commercial production of similar formations. And lastly, the court says that if by “unnatural” Salinas mean “unfair,” the law affords a panoply of other forms of relief. The court never evaluates the term “unnatural” in the context likely intended by Salinas, however, which is the unnatural migration of gas caused by the insertion of an object into another’s property. In a case discussing secondary recovery operations, *Jameson v. Ethyl Corp.*, the Supreme Court of Arkansas held that the secondary recovery activity of injecting water into another’s property to enhance recovery was conditioned by an obligation on the extracting party to compensate the owner of the depleted lands for minerals extracted in excess of natural depletion, and that if no such compensation were paid, the extracting party could be held liable in trespass. Similarly, in *Garza*, a fracture crossed property boundaries and caused minerals that would have otherwise remained resting in the rock beneath one owner’s property to migrate to another’s property. This is analogous to sending fluids underneath another’s property to force natural gas to the extraction point. Therefore, the unnatural drainage of hydrocarbons via fractures should, as in *Jameson*, require compensation or result in an actionable

254. Id.; Ragsdale, supra note 45, at 339.
256. Id.
257. Id.
258. Id.
259. *Jameson*, 609 S.W.2d 346.
claim. This requirement of compensation would have given Salinas an actionable claim, by the majority’s own logic, if such a requirement were recognized in Texas.

Also, as one of their four primary reasons for allowing the rule of capture preclude a trespass claim for hydraulic activities, the court states that “determining the value of oil and gas drained by hydraulic fracturing is the kind of issue the litigation process is least equipped to handle.” The court cites the problem that the facts are hidden thousands of feet below the surface making it difficult to truly understand what happened. This argument seems bizarre, considering that in this very case the court was being asked to do essentially that same thing when considering a breach of implied covenant claim. Although that claim was ultimately dismissed by the court, this type of claim is commonly litigated, and the court using it as a principal reason for its holding is puzzling.

Moreover, from a policy perspective, the court failed to address the way its holding would reduce, if not eviscerate, any incentive for operators to lease properties from small property owners. Under the majority’s reasoning, operators would have the ability to extend hydraulic fractures from underneath their property into an adjoining small property owners’ land, and subsequently extract hydrocarbons without having to compensate the small property owner. This ill-conceived policy essentially lets operators extend the boundaries of their lease as far as they can manage to extend their fractures.

For example, assume that there is a significant natural gas reservoir which underlies a stretch of land that includes one large property and several smaller adjoining properties. If a natural gas operator acquires the right to drill on the larger property, under the majority’s opinion, the gas operator could then extend its hydraulic fractures underneath the adjoining smaller properties and drain gas from those properties without having to negotiate a contract with the smaller property holders. Such a rule simply induces competitive drilling and waste, rather than promoting a fair and equitable development of the resource. As hydraulic fracturing technology continues to improve, the question looms as to what will prevent operators from extending fractures.

261. Id. at 16.
262. Id.
263. Id. at 18.
264. Id. at 20.
thousands and thousands of feet underneath properties that are increasingly further from the well pad?

Despite this unaddressed issue, the majority refers to public policy considerations throughout its opinion to justify its holding. The court places particular emphasis on the importance of hydraulic fracturing activities for the further development of the oil and gas industry in Texas, arguing that some drainage from adjoining properties is an unavoidable, yet necessary consequence.\textsuperscript{265} Ultimately, the court has to contort the rule of capture, by applying the rule before analyzing the legality of the action in question, in order to justify its holding on common law principles. As a result, the court relies heavily on the strength of its public policy considerations to rationalize its holding. Considering the central role that public policy considerations played in the majority’s decision, a more prudent option would have been for the court to leave to the legislature the issue of whether hydraulic fracturing activities should be exempt from trespass claims.

There is a significant danger that because \textit{Garza} is the only case to address this issue, it will be read too broadly by courts that have less experience in dealing with drilling activities, such as those in Pennsylvania. It is important to understand that \textit{Garza}’s scope is very narrow, and largely based on a unique fact pattern. Salinas was a non-possessory interest holder in the subsurface property rights, and as such, needed to demonstrate an injury in order to have an actionable trespass claim.\textsuperscript{266} The court does not address what would happen if a plaintiff who owned a possessory interest in the land brought a similar claim. Accordingly, this opinion cannot be over-read to determine the viability of a subsurface trespass of a plaintiff who owns the full rights to his/her subsurface property. The only damage claimed by the Salinas family was that of drainage; they did not assert damage to the geologic formation beneath their property, water well contamination, subsurface soil contamination, or any other type of physical damage. The court emphasizes this point, noting that if other damages had been asserted the analysis might have been different.\textsuperscript{267} Therefore, ultimately this case is limited to claims brought by non-possessory interest holders for trespass claims asserting damages only from drainage.

\textsuperscript{265} \textit{Garza}, 268 S.W.3d at 16.
\textsuperscript{266} \textit{Id.} at 9-10.
\textsuperscript{267} \textit{Id.} at 13.
B. How Pennsylvania Should Address Hydraulic Fracturing Activities and Trespass

Despite being one of the first states to have oil wells drilled in it, Pennsylvania has a comparatively limited judicial history in dealing with natural gas and oil drilling activity, as compared to Oklahoma and Texas. Pennsylvania courts may find authority from Texas and Oklahoma persuasive, but before adopting their reasoning, Pennsylvania courts need to closely scrutinize their implications. It would be prudent for Pennsylvania to ignore the Garza ruling. Pennsylvania courts should instead employ a “traditional” trespass liability regime for hydraulic activities until three specific conditions are met. The first condition that must be satisfied is that hydraulic drilling operators should be required to disclose to the public exactly what chemicals are being used in their fracking fluids. The FRAC Act, currently pending before Congress, would achieve this goal.268 Secondly, there should be a requirement that peer reviewed scientific evidence exists which demonstrates that these fluids and or natural gas do not have the capability to migrate from depth and contaminate aquifers, groundwater wells, and or surface/subsurface soils. And third, that a state or federal regulatory regime is established that strictly monitors and holds natural gas operators liable for surface spills and well casing failures. A liability regime based in trespass would be the best vehicle for holding natural gas operators accountable for their activities.

Environmental groups and individuals in Arkansas, Colorado, New Mexico, New York, Ohio, Pennsylvania, Texas, Virginia, West Virginia, and Wyoming have reported contaminated drinking water where hydraulic fracturing is the suspected cause.269 In recognition of the fact that significant portions of the Marcellus Shale lie within very close proximity to the Delaware River Basin, an area that provides water for nearly fifteen million people, the development of this shale should be done in a vigilant and cautious manner. Due to the serious public health and environmental risks that are associated with hydraulic fracturing activities, which will be described below, there is a need

for courts to adopt a legal tool to mitigate these risks. A traditional trespass liability regime would be one such tool.

1. The Public Health and Environmental Risks Associated With Hydraulic Fracturing Operations

A series of “known” and “known-unknown” issues support deploying a traditional trespass regime in Pennsylvania, which would eliminate the need to establish harm from hydraulic fracturing activities in order to have an actionable claim. It is a fact that fracking fluids have been shown to contain an alarming number of chemicals that are known to have adverse health effects ranging from endocrine disruption, to neurological disorders and cancer.270 The New York State Department of Environmental Conservation recently released a report listing up to 260 unique chemicals, including formaldehyde, pesticides, and acids that are being used for hydraulic fracturing in the Marcellus Shale in Pennsylvania and West Virginia, and that are expected to be used in New York.271

One of the chemicals listed by the Commission, benzene, has been linked to aplastic anemia and leukemia.272 This is significant because water contamination incidents have been reported with increasing frequency across the United States. One of the most recent incidents reported the discovery of benzene at 1,500 times the level safe for human consumption in a water well near a hydraulically fractured natural gas well in Wyoming.273 These fracking fluids have also been shown to contain “hydrochloric or muriatic acid, hydroxyethyl cellulose as gel, glutaraldehyde as biocide, petroleum distillate (or diesel) as friction reducer, ammonium bisulfate as oxygen scavenger, 2-

hydroxy-1,2,3-propanetricarboxylic acid for iron control, N,N-dimethyl formamide as corrosion inhibitor, ethylene glycol (or 2-butoxyethanol) as scale inhibitor, and methanol-based surfactants." 274

Many of these chemicals have been associated with a number of different health problems affecting everything from the eyes to the nervous system. 275

Additionally, shales such as the Marcellus usually contain elevated levels of naturally occurring radioactive material ("NORM"), such as uranium, thorium, and radium. 276 NORM that has been "concentrated or exposed to the accessible environment as a result of human activities, such as mineral extraction, are defined by the EPA as technologically enhanced NORM (TENORM)." 277 New York’s Department of Environmental Conservation reported that thirteen samples of flowback fracking fluid extracted from Marcellus Shale gas extraction activities contained levels of radium that were as high as 267 times the safe disposal limit for a wastewater facility and thousands of times the limit safe for people to drink. 278 A recent study presented at the annual meeting of the Geological Society of America, shows that hydraulic fracturing activities can cause uranium that is trapped naturally within the Marcellus Shale to be mobilized when it comes into contact with fracking fluids. 279 Research professor Tracey Banks notes that "[e]ven though at these levels, uranium is not a radioactive risk, it is still a toxic, deadly metal." 280

There also is a concern that the fracking fluids can come into contact with other toxic material in the subsurface, such as heavy metals and brine, which can combine with the fracturing fluid that is eventually recovered, thus creating an even more toxic mix that generates problems of disposal. 281 To emphasize the significance of this known risk, Dr. Theo Colburn of the Endocrine Disruption Exchange recently

274. Campbell, supra note 7, at 5681.
275. Id.
276. Id.
277. Id.
278. Id.
280. Id.
stated, “I think this is a major public health issue that needs to be addressed before we issue any more permits to drill any more wells.”

Perhaps even more alarming than the “known” problems, are the several “known-unknown” issues relating to fracking. In particular, a portion of the Energy Policy Act of 2005, dubbed the “Halliburton loophole,” exempts hydraulic fracturing from the Safe Drinking Water Act, thereby excusing gas companies that are engaged in hydraulic fracturing from the obligation to disclose the chemicals used in their operations. While state agencies have begun collecting some data on the composition of these fracking fluids, these fluids are exempt from federal oversight and therefore nobody, except the companies themselves, know exactly the composition of the material. Compounding this issue is the fact that no long term study has been conducted to analyze exactly what happens to these fluids once they are injected into the subsurface. While geologists speculate that the depth and pressures exerted on the injected fluid will cause it to remain in the deep subsurface, no peer-reviewed study has been performed that can confirm this theory. In fact, in section 4.6 of New York’s Department of Environmental Conservation Final Impact Assessment Report the authors note concerns over upward subsurface migration of fracking fluids due to naturally occurring subsurface fractures, fissures, and crush zones. As noted earlier, only a por-


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

284. Wiseman, supra note 161, at 141 (noting that, “No report has sufficiently investigated and compared the effects of fracting in the many formations currently being tapped for oil or gas.”).

tion, often less than half, of the produced water is later recovered by the operator. This raises a number of questions. What happens to that millions of gallons of fracking fluid that is left in the ground? How does it migrate? How long can the fluids remain suspended in the stratum? Is it possible for the fluids to migrate up in depth? Can they reach aquifers? If so, how toxic would they be? These are all important questions that need to be answered with scientific certainty.

As a result of growing concerns about these questions, the Environmental Protection Agency recently initiated a multi-year study, to start in 2011, on the impact of fracking fluids on the environment, particularly focusing on potential drinking water contamination, public health, and other environmental impacts. The E.P.A. plans to have preliminary results available sometime in 2012. Furthermore, on November 15, 2010, Halliburton announced the creation of a new fracking fluid that uses chemicals “sourced entirely from the food industry.” Halliburton officials have admitted that some of the substances used are still considered hazardous by the government even though they are used in food, such as “inorganic acid” which is used in products ranging from cheese to rust dissolver. A somewhat skeptical take on this statement is that this development just proves that the industry has the technology to economically operate in a much safer and cleaner fashion than it is currently doing.

The drilling industry often makes the contention that potentially hazardous chemicals make up less than two percent of fracking fluid, with water and sand making up the other ninety-eight percent. However, it is important to consider this percentage in the context of the scale and density of ongoing hydraulic fracturing operations. In

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287. Id.
289. Id.
290. Id.
Dimmock, Pennsylvania, for example, there are more than sixty wells in a nine-square-mile area, which averages to over six wells per square mile. If each well uses about three million gallons of fluid, that is roughly eighteen million gallons of fluid pumped down into a single square mile. When considered in this manner, even one percent becomes statistically significant, as it results in 180,000 gallons of toxic material injected into a single square mile. The potential toxic nature of these substances was on full display in April 2009, when sixteen cattle died in Louisiana after ingesting fracking fluid that had overflowed next to a drilling rig owned by Chesapeake Energy.

Additionally, in August of 2008 Newsweek reported that an employee of an energy-services company in Colorado “caught in a ‘fracturing fluid’ spill” arrived in an emergency room complaining of “nausea and headaches.” The nurse who treated the employee “began vomiting and retaining fluid” several days later. Her skin next turned yellow, and she was eventually diagnosed with chemical poisoning, which she believes was from the fracking fluid that she encountered while treating the employee. The safety data sheet, which concealed many of the elements contained in the fluid, did name methanol as being in the fluid, which if exposed to can “cause kidney and liver damage, irritate lung tissue, decrease blood pressure, and result in dizziness and vomiting.” The incident was never reported to any government agency by the company involved.

Another common claim by the industry is that the fracking fluid is pumped down about 5,000 feet below the surface and therefore the fluids are separated by nearly a mile of solid rock between where the fluids are injected and where surface water supplies are located. It is hard to reconcile this contention, however, with the fact that natural

295. Id.
296. Id.
297. Id.
298. Id.
299. Dubunking Gasland, supra note 291.
gas drilling companies entered into a joint agreement with the Environmental Protection Agency promising that they would not use diesel fuel in their hydraulic fracturing fluids. This suggests that there is some concern, either by the Environmental Protection Agency or natural gas companies, that there is a risk of some sort of contamination resulting from the use and or migration of these fracking fluids. Otherwise there would be no need for such an agreement. Additionally, there is the ever-present risk that the cement casing, which secures the fluids as they travel down the wellbore, could suffer a breakdown and crack, thus releasing fluids into the surrounding strata at a depth in which aquifers and water wells are located. This is exactly the contention that has been made in Fiorentino v. Cabot Oil and Gas Corp., where the plaintiffs contend that their water wells were contaminated with natural gas due to a failure of the well casing constructed by Cabot. Like Berish, this case is currently pending before the District Court for the Middle District of Pennsylvania. The concern over well casing integrity may in fact be a far more likely pathway for groundwater contamination, as the number of wells drastically increases in the Marcellus Shale region so too does the potential for the casings in the wells to fail.

Pennsylvania has several distinguishing characteristics that suggest the appropriate policy considerations here may differ from those in Texas. First, and most importantly, much of the Marcellus Shale overlaps with significant portions of the Delaware River Basin. This area supplies water to the cities of Philadelphia and New York City, as well as over one-third of the population of New Jersey. Thus, the consequences of a possible contaminating event are significant.

In addition, the population density in Pennsylvania is far greater than that of Texas. In fact, Pennsylvania has the tenth highest population density among all fifty states. In contrast, none of the population densities of the other major natural gas producing states are even in

302. Id.
the top half for the country.\textsuperscript{303} Therefore, not only could a contaminating event have a much greater impact in Pennsylvania than in Texas, but also the likelihood that a subsurface trespass occurs due to hydraulic fracturing activities is significantly greater in Pennsylvania because of the density of the population.

To highlight these concerns, the City Council in Pittsburgh recently unanimously voted to specifically prevent any form of hydraulic fracturing from within its city limits.\textsuperscript{304} While the legal theory through which the ban was constructed has yet to be challenged in court, the mere fact that the council made such a bold ruling speaks volumes about how concerned they, and their constituents, are about the repercussions of hydraulic fracturing activities.\textsuperscript{305} Other municipalities have tried and failed to specifically regulate natural gas operators through zoning restrictions, however, Pittsburgh’s ban may be able to withstand a legal challenge.\textsuperscript{306} Furthermore, the state of New York recently decided to institute a ban on horizontally drilled hydraulically fractured wells, which is set to be lifted in July 2011, citing concerns of the environmental effects of these drilling activities.\textsuperscript{307} As a common law remedy, a traditional trespass liability scheme would be the most effective way to mitigate the risks that these legislative bodies have identified.

2. \textit{A Traditional Trespass Liability Regime}

Of the three potentially trespassing activities, it is likely that under any interpretation of the law a court would find that a horizontally drilled wellbore that strikes into the property of another would consti-

\textsuperscript{303} An interactive list of U.S. States, including their (2010) populations, as well as land sizes and densities, WORLDATLAS (2010), http://www.worldatlas.com/aatlas/populations/usadensityh.htm (last visited Feb. 15, 2011).


\textsuperscript{305} Id.

\textsuperscript{306} See Range Resources-Appalachia, LLC v. Salem Twp., 964 A.2d 869 (Pa. 2009) (here the court held that the township’s subdivision and land development ordinance regulated the same “features” of gas drilling and wells as regulated by the Oil & Gas Act, and addressed the same objectives as the Oil & Gas Act, and hence was preempted by the Act).

stitute a trespass. In such a situation a fairly obvious analogy can be made between a horizontally drilled well, and a deviated or slant well. However, the questions of whether or not fractures extending beyond the bounds of a property or the migration of fluids or natural gas onto another’s property constitute a trespass are more difficult ones to answer.

In situations where wide-scale public health and environmental degradation are significant concerns, the law should attempt to prevent the harm before it occurs, rather than react to the harm after it occurs. Ultimately, the goal is to find a cause of action that effectively imposes an obligation on natural gas operators to avoid the transboundary migration of fluids, and a means of stopping the migration once it has been discovered. Due to the fact that hydraulic fracturing activities have been exempted from several Federal laws, such as those under the SDWA, the common law regime of trespass, in its “traditional” application, is uniquely situated to be the best vehicle to achieve these goals. Such a liability regime may also provide the additional benefit of protecting small landowners from being taken advantage of by large natural gas operators.

Originally, “[t]respass, a seemingly zero tolerance, strict liability concept, evolved to protect the sanctity of property, and damage from any trespass was presumed.” As discussed above, at common law, each unauthorized entry upon the land of another is considered a trespass. If a traditional understanding of trespass was recognized by the courts for hydraulic fracturing activities, it would eviscerate the commonly made argument by operators that because no actual harm could be demonstrated by a plaintiff the claim is not actionable. This interpretation of trespass is a particularly effective liability scheme for addressing some of the unique problems resulting from hydraulic fracturing activities, because not only does it alleviate problems related to proving actual harm; but also because the remedies under such a regime include nominal and other damages, as well as the potential to have an injunction ordered against the offending party.

309. Cutting, supra note 36 at 865.
310. See Ragsdale, supra note 45.
311. Cutting, supra note 36, at 886-87.
The Precautionary Principle provides a suitable framework to evaluate how natural gas companies should be held liable for hydraulic fracturing activities. This principle requires that once significant environmental damage is threatened, action should be taken to control or abate this possible harm even though there may be scientific uncertainty as to the exact effects of the activities. Internationally, this principle has garnered widespread adoption. This doctrine was one of the foundational elements of the Ozone Convention and its 1987 Montreal Protocol. The implementation of the principle resulted in a large number of states taking action to protect the atmosphere before the causal link between ozone depletion and CFCs had been conclusively demonstrated. The precautionary doctrine also had been adopted by a growing “number of treaty institutions dealing with marine pollution, international watercourses, air pollution and climate change, transboundary trade in hazardous waste, endangered species, and the conservation of biological diversity and marine living resources.” This theory has the potential to reverse the burden of proof, wherein it would be unacceptable for companies to carry out a potentially harmful activity, unless they could demonstrate that the activity would not cause significant harm to the environment or public.

The application of this international principle has clear implications in the context of hydraulic fracturing. Similar to 1987 Montreal Protocol, there has yet to be established a definitive scientifically-backed link between hydraulic fracturing activities and environmental or public health harms. The potential and concern for significant harm, however, has been acknowledged, as evinced by the E.P.A. initiating a multi-year study on precisely this issue. While the scale and context may be different from its more common international applications, the fundamental underpinning of the theory remains relevant for courts making decisions about actions that have potentially serious environmental impacts, such as hydraulic fracturing.

315. Id.
316. Id. at 118.
One of the unique problems that trespass liability can address in cases involving a subsurface invasion of property, is the difficulty plaintiffs face in establishing a link between the trespassing activity and an actual harm, with the requisite degree of certainty required by courts. As the majority stated in Garza, the proof is often buried “below miles of rock,” making it especially difficult to determine exactly what happened.\textsuperscript{317} Specifically, in cases where plaintiffs allege contamination of their subsurface property they often have a difficult time establishing that there was only one source of contamination which caused the property damage.\textsuperscript{318} This is a common problem in many toxic tort cases, wherein a plaintiff may be able to establish that fluids entered onto their property from a particular source, but may be unable to prove a single cause of harm where several different fluids from several different sources are simultaneously present. Operators would argue that there could be nearly an endless range of environmental factors that could have been the proximate cause of the injury, and therefore they cannot be held liable. Assigning traditional trespass liability would allow plaintiffs a certain level of protection from such a defense, as long as the plaintiffs could establish that some of the fluid migrated onto their property from an identifiable source.

In the same vein, another problem facing plaintiffs is that, unlike contaminated soil, contaminated groundwater plumes migrate.\textsuperscript{319} Therefore, it is possible for groundwater to be contaminated for a certain period of time, but by the time the contaminated water is detected, reported, and tested the fluids may have since migrated from the property. This problem was highlighted in the documentary GasLand, where the bureaucratic delay in processing a complaint resulted in the testing for water contamination so far after the event had taken place that the contaminating fluid was no longer present.\textsuperscript{320} As a result of the transient nature of these fluids, it becomes exceedingly difficult for plaintiffs to establish their existence was the single or primary cause of a particular injury.\textsuperscript{321} A traditional trespass regime would eliminate this issue, as a single cause of harm would not need to be demonstrated in order to have an actionable claim.

\textsuperscript{317} Garza, 268 S.W.3d at 16.
\textsuperscript{318} Aronovsky, supra note 235, at 97.
\textsuperscript{319} Id.
\textsuperscript{320} GASLAND (HBO Documentary Films 2010).
\textsuperscript{321} Aronovsky, supra note 235, at 97.
Despite a wide array of complaints of contaminated drinking water from hydraulic fracturing activities from a number of states, there is no record of any state case directly dealing with claims of environmental damage caused by fracking activities. However, the Berish case in Pennsylvania may be a harbinger of future problems, as hydraulic fracturing operations rapidly increase in Pennsylvania. The difficulties in establishing actual harm likely play a key part in this dearth of case law, as potential plaintiffs may be deterred by the lack of precedent and the high threshold of proof required under trespass and other liability regimes, such as nuisance. Having Pennsylvania courts recognize a traditional interpretation of trespass as a viable cause of action would alleviate these problems and provide plaintiffs with a means to stop a trespassing and potentially harmful activity, as well as provide an incentive for natural gas companies to drill more carefully. This would be a prudent choice at least until such a time that the full repercussions of hydraulic fracturing activities are better understood, or perhaps after the E.P.A.’s current study on hydraulic fracturing is completed in 2012.

As mentioned above, there is precedent that supports the idea that all three potentially trespassing activities could be subject to a claim under a traditional trespass regime. The court in Garza did not answer the question as to whether a plaintiff with a possessory interest in his subsurface property could be successful in a trespass claim without demonstrating harm. Thus, signifying that if the facts were different the analysis, and outcome, could be different as well. Additionally, in Snyder, the New Mexico Supreme Court suggested in dicta that a display of actual harm may not be a requisite element of a trespass claim with regard to a subsurface invasion of property. A similar conclusion can be drawn from ANR Pipeline, where the Western District Court of Michigan left open the possibility of a subsurface trespass without the plaintiff needing to demonstrate harm in the context of natural gas storage.

Additionally, the liability theory of “toxic trespass” provides an example of how abnormally dangerous or hazardous material can be treated under a trespass regime. A Pennsylvania court could treat hydraulic fracturing operations as an abnormally dangerous activity, par-

322. Wiseman, supra note 161, at 138.
323. Garza, 268 S.W.3d at 16.
324. See Snyder, 798 P.2d 587.
325. See ANR Pipeline, 418 F. Supp. 2d 933.
ticularly if the drilling is done close to large population centers or environmentally sensitive areas. There are traces of precedence for such a finding in section 601.208 of the Pennsylvania Oil and Gas Act that creates a rebuttable presumption of liability for those natural gas operators that drill wells within 1,000 feet of a water well and that water well then becomes contaminated. If a court chooses to make this analogy it is likely that at least the potentially trespassing activity of the migration of fracking fluids would be actionable without having to demonstrate harm. Until it has been established that these fracturing fluids are not a hazardous threat to the environment or surrounding populations, it would be wise to treat these fracking fluids as if they were harmful.

If Pennsylvania courts were to reject applying trespass in its traditional form in the context of hydraulic fracturing activities, they should, at least, recognize subsurface trespass claims where the plaintiffs can establish actual harm. As discussed above, one common theme that has emerged regarding activities analogous to hydraulic fracturing operations is that where plaintiffs can demonstrate actual harm to their property, as the result of activities conducted on another’s land, there exists an actionable trespass claim. This argument can be made by collectively analogizing the cases of deviated wells (Lachman), secondary recovery operations (Casinos and Greyhound), water disposal activities (Snyder and FPL Farming), subsurface storage reservoirs (ANR Pipeline), and other subsurface liability case law (Hoery and Yommer) to that of hydraulic fracturing. Thus, establishing that if actual harm can be demonstrated as a result of hydraulic fracturing activities a plaintiff would have an actionable trespass claim. Even the language in Garza itself indicates that if the Salinas family had claimed that Coastal’s hydraulic fracturing operations damaged Salinas’ wells, the geological formation beneath his property, or resulted in proppants being deposited on the surface of Salinas’s land, Salinas would likely have had an actionable trespass claim.

Pennsylvania courts have specifically acknowledged that a claim for trespass for the subsurface migration of fluids exists, and is actionable. This was articulated in Dombrowski, where the court found that the migration of toxic battery fluid from a neighboring property could

327. Garza, 268 S.W.3d at 11, 13.
give rise to an actionable trespass claim. In the context of hydraulic fracturing, the subsurface migration of battery fluid contaminants could closely be analogized to the subsurface movement of fracking fluids. As such, it is likely that Pennsylvania courts would recognize that the migration of fracking fluids could give rise to an actionable trespass claim if actual harm to the plaintiff’s property were to be established. If Pennsylvania courts were to recognize such a claim, an important question would additionally need to be considered, as to whether the migration of fracking fluids constituted a “permanent” or “continuing” trespass, as such a determination would impact whether or not the statute of limitations would be tolled. As discussed above, “the critical distinction is whether the injury is permanent and effects a permanent change in the condition of the land, or whether the action concerns separate and recurrent injuries which cannot be ascertained or estimated so as to be brought in a single action.”

While traditionally, Pennsylvania courts have found that environmental contamination cases result in a permanent trespass, an argument could be made that because of the transient nature of these fracking fluids they could constitute a continuing trespass, which could be remediated by an injunction against the offending party. It would be more difficult to analogize the fractures themselves as a trespassing activity, as their harm would likely be different in nature than that of migrating fluids.

Even if Pennsylvania courts were to adopt Garza the ruling does not necessarily preclude Pennsylvania courts from recognizing drainage as a form of damage in the context of a subsurface trespass of the fractures themselves. As discussed above, the court in Jameson, suggested in the context of a secondary recovery operation drainage may be considered an actionable damage in support of a trespass claim. The holding by the Arkansas Supreme Court in that case made it clear that secondary recovery processes in their state were “conditioned, however, by imposing an obligation on the extracting party to compensate the owner of the depleted lands for the minerals extracted in excess of natural depletion.”

328. See Dombrowski, 954 F. Supp. at 1013.
330. See, e.g., Degussa, 280 F. Supp. 2d at 408; Dombrowski, 954 F. Supp. at 1013.
331. See Jameson, 609 S.W.2d 346.
332. Id. at 351.
applied to hydraulic fracturing activities, where gas that was previously resting beneath a person’s property was extracted and captured by the operator of an adjoining property.

The Pennsylvania Supreme Court in *U.S. Steel v. Hoge* also suggested that Pennsylvania courts may address the issue of drainage being considered damages differently than the *Garza* court. In *U.S. Steel v. Hoge*, the Pennsylvania Supreme Court ruled that natural gas, which was chemically bonded to coal, was owned by the person who had acquired the subsurface rights to the coal, in that case, U.S. Steel. When Hoge later contracted to drill into the coal to extract the gas, he was found to be liable for trespass. This logic suggests that in Pennsylvania there is precedent for holding that the drainage of gas resting beneath ones property via hydraulic fracturing techniques from another property, is actionable in trespass. Taken together, *Jameson* and *Hoge*, in addition to the critique of the reasoning in *Garza*, collectively provide a powerful argument for having Pennsylvania courts recognize drainage as damage in the context of hydraulic fracturing activities.

What is truly needed to address these issues is a more comprehensive federal or state regulatory scheme; however, in the interim a traditional interpretation of the common law of trespass would be an excellent tool to preempt the potentially serious environmental and public health effects of hydraulic fracturing operations. Traditional trespass would provide a cause of action for all three potentially trespassing activities, and provide appropriate remedies. If such an interpretation is not accepted by Pennsylvania courts, a compelling argument can still be made for a claim to be actionable in trespass from hydraulic fracturing activities where the plaintiff can establish actual harm. Pennsylvania courts should take a precautionary approach to this issue, ignore the misguided *Garza* ruling, and instead implement one of these two liability regimes.

**CONCLUSION**

It is undeniable that hydraulic fracturing and horizontal drilling activities are indispensable for the commercial production of natural gas in the Marcellus Shale. Furthermore, the expansion of drilling in Pennsylvania will surely create a massive influx of revenue for counties in rural areas that are in desperate need of funds. Additionally, the energy provided by drilling in the Marcellus Shale has the potential to completely change the energy mix in the United States by
providing an enormous and stable amount of a low carbon emission fuel.

However, as evinced by the Deep Water Horizon catastrophe, there are significant dangers to both public health and the environment enmeshed with the development of resources through technologies that are not completely understood. As such, it would be prudent for Pennsylvania courts to take a precautionary approach when making decisions about the legal framework from which to approach the problems raised by hydraulic fracturing activities.

It has not been argued here that a trespass liability scheme, based on a traditional understanding of trespass, is the long term solution to these legal issues. Rather, the argument is that until we better understand the consequences of using these new technologies and techniques, an appropriate legal regime based on a trespass should be observed by the courts. Such a regime would not only provide a means of protection for small property holders from being taken advantage of by large natural gas companies, but also, and more importantly, provide a strong deterrent for natural gas companies to take part in risky activities that have the potential to contaminate nearby properties through their drilling activities.