

North Carolina's Presumptive Liability for Hydraulic Fracturing: An Appropriate Standard for North Carolina?

Brian Phillips

Introduction

Hydraulic fracturing or “fracking” is the process of creating fractures in shale to allow gas to flow from shale formations.¹ Once a well is drilled, operators pump water, sand, and other additives—usually chemicals—at high pressures into the well to create the fractures.² These fractures allow the gas to flow freely back up to the surface where it is collected.³ The fracking fluid is also supposed to return to the surface where it will be either disposed of or reused.⁴ Due to the fracking process, there are some concerns that fracking could negatively impact drinking or groundwater.⁵ Although fracking was first used in the 1940s, it has become much more common throughout the United States today.⁶

North Carolina is set to begin its foray into hydraulic fracturing starting in mid-2014.⁷ The Clean Energy and Economic Security Act, passed over the governor's veto, will allow fracking to take place in North Carolina at that time.⁸ The statute creates a presumption of liability for groundwater contamination.⁹ Essentially presumptive liability in the fracking context means that a court will infer that a well operator is liable for any groundwater contamination within a specific range if the fracking operations are active within a given distance

¹ See *Hydraulic Fracturing: Fact Sheet*, CHESAPEAKE ENERGY, 1 (May 2012), http://www.chk.com/Media/Educational-Library/Fact-Sheets/Corporate/Hydraulic_Fracturing_Fact_Sheet.pdf.

² *Id.*

³ *Id.*

⁴ *Id.*

⁵ See *Science in Action: Hydraulic Fracturing Research Study*, EPA.GOV, 1 (June 2010), <http://www.epa.gov/safewater/uic/pdfs/hfresearchstudyfs.pdf>.

⁶ CHESAPEAKE ENERGY, *supra* note 1.

⁷ See Jake Seaton, *N.C. Lawmakers Override Perdue's Veto of Fracking Bill*, NBC 17 NEWS (July 2, 2012), <http://www2.nbc17.com/news/2012/jul/02/6/nc-senate-votes-override-veto-fracking-bill-ar-2402058/>.

⁸ *Id.*

⁹ Clean Energy and Economic Security Act, 2012, ch. 143. §113-421, 2012 N.C. Sess. Laws 658, *available at* <http://www.ncleg.net/Sessions/2011/Bills/Senate/HTML/S820v6.html>.

of that well. The North Carolina statute, for example, presumes that oil and gas operators and developers will be liable for contamination of all water supplies within 5,000 feet of an oil or gas wellhead.¹⁰ This presumptive liability attaches unless the presumption is rebutted.¹¹ The statute provides several conditions that can be met in order to rebut the liability.¹² For instance, the fracking companies must show that either the contamination existed before drilling started,¹³ the water supply owner refused to allow pre-drilling tests,¹⁴ the water supply is not actually within 5,000 feet of any oil or gas wellhead operation,¹⁵ or the contamination occurred as the result of another activity unrelated to the activities of the oil or gas developer or operator.¹⁶ Similarly, oil and gas developers and operators are responsible for reclamation efforts, remediation of contaminated areas, and replacement water supplies if needed.¹⁷ In sum, based on the strong presumptive liability standard that North Carolina has implemented, it appears that North Carolina views the environmental concern of contaminated ground water from fracking as highly important. This paper briefly examines current academic research on legal liability and causation problems associated with fracking and other states' presumptive liability statutes. The paper then briefly discusses some potential implications for the North Carolina statute in light of other state statutes and academic debate.

¹⁰ *Id.*

¹¹ *Id.*

¹² *Id.*

¹³ Clean Energy and Economic Security Act §113-421 (1)(a).

¹⁴ *Id.* § (1)(b).

¹⁵ *Id.* § (1)(c).

¹⁶ *Id.* § (1)(d).

¹⁷ *Id.* §§ (a2-a4).

The Legal Argument for Strict Liability

Legal arguments for strict liability in the fracking context have recently emerged. Two such arguments are that drinking water is so vital that it should be prioritized over hydraulic fracturing and that fracking companies should be forced to weigh the economic costs and benefits of their actions.¹⁸ A recent note in the Boston College Environmental Affairs Law Review argues that states should impose strict liability for groundwater contamination caused by hydraulic fracturing companies to better balance the need for energy with the importance of maintaining clean groundwater.¹⁹ The policy argument is essentially that oil and gas companies should either make economic decisions that weigh the costs and benefits of paying for clean-up and recovery efforts from contamination or take actions to minimize groundwater contamination.²⁰ Authorities lobby strongly for strict liability because reasonable care would not reduce the risk of harm caused by fracking.²¹ Because the fracking companies say fracking is safe, it would follow that the oil and gas operators are already taking due care, and thus, any contamination should result in strict liability for the drillers.²²

Currently, plaintiffs in two cases in Pennsylvania—also a state with a presumptive liability statute—are seeking to impose strict liability for groundwater contamination that is believed to have been caused by fracking.²³ The plaintiffs argue that hydraulic fracturing is an

¹⁸ See generally Ryan Murphy, Amy Purpura, & Malia Dalesandry, *Strict Liability for Fracking: Risks Should Fall on Wall Street, Not Main Street*, THE BEACON HILL INSTITUTE AT SUFFOLK UNIV. (Sept. 2012), <http://www.beaconhill.org/BHISudies/Energy/Fracking2012-0924RM.pdf>.

¹⁹ See Hannah Coman, Note, *Balancing the Need for Energy and Clean Water: The Case for Applying Strict Liability in Hydraulic Fracturing Suits*, 39 B.C. ENVTL. AFF. L. REV. 131, 131 (2012).

²⁰ See Nathan R. Hoffman, *The Feasibility of Applying Strict-Liability Principles to Carbon Capture and Storage*, 49 WASHBURN L.J. 527, 539 (2010).

²¹ Coman, *supra* note 19 at 155-56.

²² *Id.* at 156.

²³ See *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F. Supp. 2d 506 (M.D. Pa. 2010) ; *Berish v. Sw. Energy Prod. Co.*, 763 F. Supp. 2d 702 (M.D. Pa. 2011)).

“ultra hazardous and abnormally dangerous” activity.²⁴ In the two cases currently being litigated, the allegedly contaminated water supplies are located within 1,700 feet from fracking operations.²⁵ Ultimately, strict liability should be imposed because of environmental concerns, though some authority believes that result may be unlikely because of social policy concerns and politics.²⁶

Similarly, in order for strict liability to be appropriate in the fracking context its use must be appropriate.²⁷ Reasonable care alone would not be sufficient to eliminate risks from hydraulic fracturing.²⁸ In order to apply strict liability to fracking, there should be an “(a) existence of a high degree of risk of some harm to [another]; (b) likelihood that the harm . . . will be great; [and] (c) inability to eliminate the risk by the exercise of reasonable care.”²⁹ In the context of fracking, there is a relatively low risk of contamination, but the resultant harm that can occur would be great because of the permanency of the water contamination.³⁰ The gravity of permanent water contamination should serve to outweigh the first threshold factor.³¹ Moreover, it is unlikely that companies can take reasonable care to eliminate the risk of groundwater contamination during fracking operations because companies cannot fully recover all fracking fluids used during the process.³² After fracking, companies may lose as much as eighty percent

²⁴ Plaintiff’s Complaint at 17, *Berish v. Sw. Energy Prod. Co.*, No. 210-1882CP, 2010 WL 4230599 (M.D. Pa. 2010), *available at* <http://graphics8.nytimes.com/images/blogs/greeninc/complaint.pdf>; Amended Complaint, *Fiorentino v. Cabot Oil & Gas Corp.*, No. 3:09-cv-02284-TIV, 2010 WL 931974 (M.D. Pa. 2010)

²⁵ *Berish Complaint*, *supra* note 14, ¶ 11.

²⁶ *See Coman*, *supra* note 19 at 154.

²⁷ *Id.*

²⁸ *Id.*

²⁹ RESTATEMENT (SECOND) OF TORTS §520 (1977).

³⁰ *See Coman*, *supra* note 19 at 154.

³¹ *See id.*

³² *Id.* at 155.

of fracking fluid.³³ As such, some legal authorities have concluded that fracking meets the first three threshold factors for strict liability.³⁴

After meeting the first three factors, fracking must be subjected to the three additional legal factors that are primarily based on social policy considerations to determine whether strict liability should apply.³⁵ The fourth factor is whether fracking can be viewed as something that is a common usage of the land.³⁶ It is uncertain in Pennsylvania whether fracking can be defined as common because of trend of land usage from farm to natural gas extraction.³⁷ Relative to such a debate is whether land is appropriate for fracking.³⁸ In Pennsylvania, rural areas are considered acceptable drilling locations while urban areas are not.³⁹ However, the unclear distinction between rural and urban areas poses problems because it is hard to define what is truly rural and what is sufficiently urban to prevent fracking. The final factor to consider is the benefit derived from fracking.⁴⁰ This factor relies almost exclusively on the specific facts of an individual case and is difficult to apply generally. Some authorities argue that the importance of clean water trumps the economic benefits obtained through hydraulic fracturing.⁴¹ Finally, the argument remains that because there is a lack of regulation and it is difficult to prove causation, plaintiffs should be able to recover by using strict liability.⁴²

³³ See Chesapeake Energy, *supra* note 1.

³⁴ Coman, *supra* note 18 at 156.

³⁵ *Id.*

³⁶ *Id.*

³⁷ See Clifford Krauss & Tom Zeller, Jr., *When a Rig Moves In Next Door*, N.Y. TIMES, Nov. 7, 2010.

³⁸ See *id.*

³⁹ Coman, *supra* note 19 at 156.

⁴⁰ See RESTATEMENT, *supra* note 29; see also Coman *supra* note 19 at 158.

⁴¹ Coman, *supra* note 19 at 158.

⁴² *Id.*

The Legal Argument Against Presumptive Liability

Conversely, other legal authorities argue that fracking is safe and does not cause groundwater contamination.⁴³ In fact, these authorities argue that plaintiffs in lawsuits across the United States have not established a causal connection between fracking and contamination.⁴⁴ The underlying argument against imposing a strong liability standard for fracking is that fracking is geologically and scientifically unlikely to cause groundwater contamination.⁴⁵ In fact, these authorities assert that drillers have thus far successfully rebutted arguments in court that fracturing in shale can contaminate groundwater.⁴⁶

Not a single property owner's case of contaminated groundwater, throughout the United States, has succeeded in proving causation.⁴⁷ In some cases, the plaintiffs voluntarily dismissed their cases when confronted with motions for summary judgment because they were unable to prove a casual nexus between fracking and groundwater contamination.⁴⁸ Although the suits have alleged trespass, negligence, nuisance, and strict liability, each suit has fallen short on the causation element.⁴⁹ In fact, landowners generally claim that their wells are contaminated from the fracking simply because there are hydraulic fracturing operations nearby.⁵⁰ The cases rarely identify potential causal elements. In a case that garnered national attention, for example, *Lipsky v. Range Prod. Co.*,⁵¹ the Texas Railroad Commission, a regulatory body charged with oversight

⁴³ Jeffrey C. King, Jamie Lavergne Bryan, & Meredith Clark, *Factual Causation: The Missing Link in Hydraulic Fracture-Groundwater Contamination Litigation*, 22 DUKE ENVTL. L. & POL'Y F. 341, 360 (2012).

⁴⁴ *Id.* at 341.

⁴⁵ *Id.* at 342.

⁴⁶ *Id.* at 344.

⁴⁷ *See id.*

⁴⁸ *See, e.g.,* Harris v. Devon Energy Prod. Co., No. 4:10-CV-00708-MHS-ALM (E.D. Tex. dismissed Jan. 25, 2012); Smith v. Devon Energy Prod. Co., No. 4:11-CV-00104 (E.D. Tex. filed Mar. 7, 2011).

⁴⁹ *See* King, *supra* note 43 at 344.

⁵⁰ *See id.* at 346.

⁵¹ No. 02-12-00098-CV, 2012 WL 3600014, at *1 (Tex. Ct. App. 2012), *available at* http://scholar.google.com/scholar_case?case=13719255115906783709&hl=en&as_sdt=2&as_vis=1&oi=scholar.

of fracturing in Texas, concluded that the defendant, Range Resources, had conclusively proven that it was not the source of the groundwater contamination of the Lipsky's well.⁵²

Several authorities argue that the fracking process itself is unlikely to cause contamination.⁵³ They cite studies that indicate that “it is physically impossible for hydraulic fracturing to create vertical pathways from oil and gas bearing shale formations” into groundwater.⁵⁴ In essence, the studies note that there is too much distance between the two areas geologically for the fracking to cause groundwater contamination.⁵⁵ For example, the Chairperson of the Texas Railroad Commission stated in testimony that one has “a better chance of hitting the moon with a roman candle” than contaminating groundwater during the fracking process.⁵⁶ The inference drawn from her testimony is that it is nearly impossible to contaminate water from fracking.

Some authors have conceded that improper well casings are a potential cause of groundwater contamination.⁵⁷ They argue, however, that the actual fracturing process itself is not the problem.⁵⁸ The surface casing and cementing of the well have nothing to do with the actual hydraulic fracturing of shale rocks. In fact, the well casing—if done properly—will prevent spills and potential groundwater contamination.⁵⁹ By simply casing and cementing the well correctly, hydraulic fracturing can be done safely, and the key steps will have been taken to

⁵² R.R. Comm'n of Tex. Doc. No. 7B-0268629, 19 (Mar. 7, 2011), <http://www.rrc.state.tx.us/meetings/ogpfd/RangePFD.PDF>.

⁵³ See, e.g., King, *supra* note 43, at 350; *Review of Hydraulic Fracturing Technology and Practices: Hearing Before the H. Comm. on Sci., Space, and Tech.*, 112th Cong. 18 (2011) (statement of Elizabeth Ames Jones, Chairperson, R.R. Comm'n of Tex.), available at <http://www.gpo.gov/fdsys/pkg/CHRG-112hhrg66221/pdf/CHRG-112hhrg66221.pdf>.

⁵⁴ King, *supra* note 43, at 350.

⁵⁵ *Id.*

⁵⁶ *Review of Hydraulic Fracturing*, *supra* note 53, at 18.

⁵⁷ See King, *supra* note 43, at 351.

⁵⁸ *Id.*

⁵⁹ *Id.*

prevent groundwater contamination.⁶⁰ This is because the well casings are designed to prevent fluids from moving from groundwater aquifers to the hydro-carbon bearing areas.⁶¹

Similarly, these authorities have identified several studies that they argue have not found any conclusive evidence that fracking causes water contamination.⁶² Even one of the most recent studies to date, conducted by researchers at Duke University, examined drinking water but did not establish a causal link between hydraulic fracturing and groundwater contamination.⁶³ The Duke study did find some evidence of methane in water samples near gas wells, but the researchers could not compare the samples to historical levels.⁶⁴ Additionally, the study did not find evidence of fracking fluid in groundwater.⁶⁵ Studies in Pennsylvania and Texas, two of the most commonly fracked states, have found little or no evidence of groundwater contamination as a result of hydraulic fracturing.⁶⁶ Due to the lack of casual evidence between fracking and groundwater contamination, the practice of presumptive liability for groundwater contamination would be in jeopardy.

⁶⁰ See *Hydraulic Fracturing Operations--Well Construction and Integrity Guidelines: API Guidance Document HF1*, AM. PETROLEUM INST. 15 (2009) available at http://www.api.org/policy/exploration/hydraulicfracturing/upload/API_HF1.pdf, §3.1, page 2.

⁶¹ See *id.*

⁶² See King, *supra* note 43 at 353.

⁶³ See Jackson RB, B Rainey Pearson, SG Osborn, NR Warner, & A Vengosh 4,7 (2011), *Research and Policy Recommendations for Hydraulic Fracturing and Shale-gas Extraction*. CTR. ON GLOBAL CHANGE, DUKE UNIV., <http://www.nicholas.duke.edu/cgc/HydraulicFracturingWhitepaper2011.pdf>.

⁶⁴ See King, *supra* note 43 at 353.

⁶⁵ See Jackson, *supra* note 63 at 4.

⁶⁶ See e.g., *Fact-Based Regulation for Environmental Protection in Shale Gas Development*, ENERGY INST., UNIV. OF TEX. AT AUSTIN 4 (2012), http://energy.utexas.edu/index.php?option=com_content&view=article&id=151&Itemid=160, 18; Elizabeth W. Boyer et. al., *The Impact of Marcellus Gas Drilling on Rural Drinking Water Supplies*, CTR. FOR RURAL PA. (March 2012), http://www.rural.palegislature.us/documents/reports/Marcellus_and_drinking_water_2012.pdf.

Experiences in West Virginia, Pennsylvania, and Michigan

In practice, however, state statutes strike a balance between imposing strict liability and regarding hydraulic fracturing as safe. West Virginia and Pennsylvania, for example, both presume that a developer or operator is legally responsible for water contamination when the contamination occurs within a specific distance of a wellhead.⁶⁷ The two states recently expanded the radius of presumptive liability for oil and gas operators for matters of contaminated groundwater.⁶⁸ In West Virginia, the original range for presumptive liability was 1,000 feet.⁶⁹ West Virginia recently enacted legislation to push the presumptive range out to 1,500 feet for a horizontal well similar to the wells that will be covered by the North Carolina statute.⁷⁰ This has the effect of making the presumptive liability broader than it was before. Like North Carolina's statute, West Virginia provides oil and gas operators several rebuttable defenses for presumptive liability that almost mirror the North Carolina statute in language.⁷¹ For example, West Virginia allows liability to be rebutted by showing that the pollution occurred before the drilling, the land owner refused to allow pre-drilling tests, the contamination was not caused by the company, or the well was more than 1,500 feet away.⁷² However, a proposed amendment in West Virginia in February, 2012, attempted to expand further the range covered by presumptive liability up to 3,500 feet of any wellhead.⁷³ Additionally, the proposed amendment will expand the time frame

⁶⁷ See Sarah K. Adair, Brooks Rainey Pearson, Jonas Monast, Avner Vengosh, Robert B. & Jackson, *Considering Shale Gas Extraction in North Carolina: Lessons from Other States*, 22 DUKE ENVTL. L. & POL'Y F. 257, 268 (2012).

⁶⁸ *Id.* at 269.

⁶⁹ *Id.*

⁷⁰ W. VA. CODE, § 22-6A-18(b) (2011).

⁷¹ *Id.* §§ (c)(1-5).

⁷² *Id.*

⁷³ *Requiring an Emergency, Temporary and Permanent Water Supply When Gas and Oil Operations Have Resulted in Contamination, Diminution or Interruption* 2012 W. Va. H.B. 4386, W. Va. 18th Leg. (2012), available at http://www.legis.state.wv.us/Bill_Text_HTML/2012_SESSIONS/RS/Bills/hb4386%20intr.htm.

for presumptive liability after the completion of drilling activities out to one year.⁷⁴

Interestingly, the proposed amendment will remove the ability of oil and gas operators to rebut presumptive liability by arguing that the water contamination occurred from some other source other than drilling.⁷⁵

In Pennsylvania, two separate standards exist for presumptive liability.⁷⁶ The first standard presumes that oil and gas operators are liable for all water contamination within 1,000 feet of a wellhead if the pollution occurred within six months of the completion of drilling activities.⁷⁷ On the other hand, the statute expanded the range for “unconventional vertical well bore[s]” to 2,500 feet and extended the time frame out to one year after the completion of drilling activities.⁷⁸ Like the West Virginia and North Carolina statutes, the Pennsylvania statute provides many similar defenses to rebut liability.⁷⁹ For instance, it allows operators to rebut liability by showing that the contamination already existed, the well was beyond the range of presumptive liability, or that the drilling activities were not the cause of the contamination.⁸⁰ The North Carolina statute again largely mirrors the Pennsylvania statute in terms of defining presumptive liability and possible defenses to liability.

In Michigan, recently proposed legislation would allow presumptive liability for hydraulic fracturing in the state. Michigan’s statute, however, does not set a distance range for which drilling companies will be liable. Instead, it announces a vague standard that if there is groundwater contamination in the “vicinity of a well being used for hydraulic fracturing,” then

⁷⁴ *Id.* § (c)(4).

⁷⁵ *Id.* § (c)(5).

⁷⁶ An Act Amending Title 58 (Oil & Gas) H.B. 1950, § 3218(c) (Pa. 2012).

⁷⁷ *Id.* §§ 3218(c)(1)(i), (ii).

⁷⁸ *Id.* §§ 3218(c)(2)(i), (ii).

⁷⁹ *Id.* § 3218(d).

⁸⁰ *Id.*

liability attaches.⁸¹ The statute indicates that the presumption is rebuttable but does not list any possible ways to rebut the liability.⁸² Overall, the statutes in West Virginia, Pennsylvania, and Michigan place the academic debate about legal liability for fracking in context. Likewise, these statutes allow for a framework with which to compare against North Carolina.

Where Does North Carolina Stand?

After a review of other state statutes and current academic debate, North Carolina has taken a reasonable approach with its presumptive liability statute because it is similar to other state statutes even though it has slightly stricter standards than Pennsylvania and West Virginia. There are two key differences between the North Carolina statute and those from West Virginia and Pennsylvania. The first major difference is that North Carolina's presumptive liability range is 5,000 feet from a wellhead.⁸³ This standard is slightly further than other state regulations set at 1,500 feet and 2,500 feet.⁸⁴ The recent Duke study noted that methane levels were higher generally within 3,000 feet of a wellhead.⁸⁵ As such, it argued for a presumptive liability range of 3,000 feet.⁸⁶

North Carolina's statute is more lenient than that proposed in Michigan. The Michigan statute is so broad that it sets the distance requirement for presumptive liability as in the "vicinity" of fracking operations.⁸⁷ This presumptive liability could hypothetically extend to distances greater than the 5,000 feet allowed by North Carolina. Overall, the North Carolina

⁸¹ H.B. 4736, 2011 Leg., 96th Sess. (Mich. 2011), available at <http://www.legislature.mi.gov/documents/2011-2012/billintroduced/House/pdf/2011-HIB-4736.pdf>.

⁸² *Id.*

⁸³ Clean Energy and Economic Security Act, *supra* note 8.

⁸⁴ W. VA. CODE, § 22-6A-18(b) (2011); An Act Amending Title 58 (Oil & Gas) H.B. 1950, § 3218(c) (Pa. 2012).

⁸⁵ See Jackson, *supra* note 63, at 7.

⁸⁶ *Id.*

⁸⁷ H.B. 4736, 2011 Leg., 96th Sess. (Mich. 2011), available at <http://www.legislature.mi.gov/documents/2011-2012/billintroduced/House/pdf/2011-HIB-4736.pdf>.

statute presents a tough presumptive range of liability but is not overly strict as to make it unreasonable especially in light of the vague proposed statute in Michigan.

Additionally, North Carolina does not have a statutory provision that allows a fracking company to rebut liability beyond a certain date after fracking operations end like the statutes in West Virginia or Pennsylvania. In both West Virginia and Pennsylvania, the presumptive liability can be rebutted by drilling operators if it is shown that the groundwater contamination at issue occurred after a certain time period in which drilling activities had ceased.⁸⁸ In Michigan, however, there is no statutory criterion to rebut liability.⁸⁹

Comparing North Carolina against the backdrop of the two sides of the academic debate over the appropriate legal liability standard, the North Carolina statute leans slightly more towards the strict liability side. By instituting presumptive liability, North Carolina acknowledges the environmental concerns associated with fracking. In applying the factors of the strict liability test to North Carolina, the three threshold factors remain essentially the same.⁹⁰ However, the social policy factors spelled out in the second set of factors might make strict liability a more attractive approach.⁹¹ For instance, it is much clearer that fracking is not a common usage of the land as is the case in Pennsylvania. North Carolina does not have active oil or gas operations or comprehensive regulations guiding the industry like other states.⁹² Similarly, because of the smaller size of North Carolina's shale, the economic benefits derived from fracking will likely be smaller than those derived from the Marcellus Shale.⁹³

⁸⁸ W. VA. CODE, § 22-6A-18(b) (2011); An Act Amending Title 58 (Oil & Gas) H.B. 1950, § 3218(c) (Pa. 2012).

⁸⁹ H.B. 4736, 2011 Leg., 96th Sess. (Mich. 2011), available at <http://www.legislature.mi.gov/documents/2011-2012/billintroduced/House/pdf/2011-HIB-4736.pdf>.

⁹⁰ See Coman, *supra* note 19.

⁹¹ See Coman, *supra* note 19 at 156, 143–44.

⁹² Adair, *supra* note 67 at 259.

⁹³ *Id.* at 263.

On the other hand, the standard of presumptive liability would be too strong when compared to the argument that there has been a lack of causal evidence between fracking and groundwater contamination. The presumptive liability would shift the burden of proof to the fracturing companies to show that they are not the cause of groundwater contamination. As such, a presumptive liability standard in North Carolina could be viewed as too harsh. This is especially true considering the stricter range of liability both in distance from a wellhead and no ability to rebut liability after drilling operations are completed.

Conclusion

North Carolina is taking a responsible approach until it is more apparent as to how fracking will develop in North Carolina. North Carolina could address many of the concerns about causality of groundwater contamination by extensively sampling groundwater before drilling occurs to get baseline data.⁹⁴ Once drilling begins, North Carolina could sample water consistently to monitor the possible contamination from fracturing. North Carolina could revise its presumptive liability statute to make it similar to West Virginia or Pennsylvania, or it could push for strict liability. On the other hand, it could also relax regulations if there continues to be insufficient evidence of causation as some authorities argue.

⁹⁴ *Id.* at 265.