

**RIGGING RIGHTS OF PASSAGE: ANALYZING SUBSURFACE
EASEMENTS IN HORIZONTAL DRILLING**

INTRODUCTION	2
I. HORIZONTAL DRILLING AND SUBSURFACE RIGHTS.....	4
A. <i>Horizontal Drilling Basics</i>	4
B. <i>Subsurface Implications</i>	5
1. The <i>Ad Coelum</i> Doctrine Governs Traditional Rights Against Trespass.....	5
2. <i>Ad Coelum</i> Refined in <i>United States v. Causby</i>	6
3. Pore Space Designation and Development.....	7
4. Directional Wellbore Passage Through Unpooled Tracts.....	7
a. <i>Humble Oil & Refining Co. v. L&G Oil Co.</i>	8
b. <i>Chevron Oil Co. v. Howell</i>	8
c. <i>Lightning Oil Co. v. Anadarko E&P Onshore, LLC</i>	9
II. ANALYZING TRADITIONAL AND MODERN APPROACHES TO SUBSURFACE EASEMENTS.....	10
A. <i>Protecting Traditional Property Entitlements of Surface and Subsurface Owners</i>	10
1. Easements From Both Surface and Subsurface Owners.....	10
2. Easements From Surface or Subsurface Owner.....	11
B. <i>Accommodating Modern Energy by Limiting Private Entitlements</i> ...	12
1. Subsurface Trespass for Only Substantial Damage.....	12
2. Designate Private Subsurface as a “Public Commons”.....	14
III. GRANTING SUBSURFACE EASEMENTS.....	16
A. <i>Protecting Operator Liability While Respecting Common Law Rights</i>	16
B. <i>Need for Adherence to the Ad Coelum Doctrine</i>	16
C. <i>Practical Considerations in Respecting Easements and Entitlements</i>	18
CONCLUSION.....	19

INTRODUCTION

Horizontal drilling, as one key component in the domestic energy revolution underway in America, provides operators tremendous access to untapped oil and gas reservoirs.¹ With horizontal drilling and hydraulic fracturing opening the door to unconventional oil and gas plays, state governments, attorneys, mineral owners, and the oil industry are adapting to the implications of lateral exploration throughout the United States.²

Courts and regulators must decide the most effective means of approaching subsurface trespass or interference issues stemming from horizontal drilling.³ The horizontal wellbore *must* pass through the subsurface in order to realize the drilling operation, and practitioners recognize differing approaches to addressing underground passage and intrusion.⁴ For a horizontal drilling and fracturing operation, the costs and any liability, including damages stemming from improper operation, are great.⁵ While oil companies continue to develop horizontal drilling plays unabated, tension grows between accommodating modern technology, economic development, and existing property entitlements.⁶

¹ See, e.g., Robert D. Blackwell & Meghan L. O'Sullivan, *America's Energy Edge: The Geopolitical Consequences of the Shale Revolution*, FOREIGN AFFAIRS, Mar./Apr. 2014, at 102.

² Horizontal drilling spurred a "mini-boom" during the early 1990s in Texas from the technology's core beginnings in the Austin Chalk and Barnett Formations, and in North Dakota's Bakken Formation. Christy M. Schweikhardt, *Horizontal Perspective: Texas Oil & Gas Law in Light of Horizontal Drilling Technology*, 34 S. Tex. L. Rev. 329, 329-331 (1993). In 1990, there were around 1,000 horizontal wells drilled worldwide. U.S. DEP'T OF ENERGY, ENERGY INFORMATION ADMINISTRATION, OFFICE OF OIL AND GAS, DRILLING SIDEWAYS--A REVIEW OF HORIZONTAL WELL TECHNOLOGY AND ITS DOMESTIC APPLICATION (Apr. 1993) at 8. By early 2013, there were over 200 rigs currently drilling horizontal wells in the Bakken formation alone. Chip Brown, *North Dakota Went Boom*, N.Y. TIMES (Jan. 31, 2013), <http://www.nytimes.com/2013/02/03/magazine/north-dakota-went-boom.html?pagewanted=all>.

³ "As most states grapple with new regulation, it is hoped that regulators recognize that the advantages of horizontal techniques are significant and that efforts must be made to foster and facilitate horizontal developments of domestic hydrocarbon reserves." Michael J. Wozniak & Jamie L. Jost, *Horizontal Drilling: Why It's Much Better to 'Lay Down' than to 'Stand Up' and What Is an '18° Azimuth' Anyway?*, 57 ROCKY MT. MIN. L. INST. 11-1, 11-29 (2011).

⁴ See *infra* notes notes 60-95 and accompanying text.

⁵ "Onshore, the proliferation of horizontal drilling means that a typical well can cost into the millions." Howard L. Boigon & Ana Gutierrez, *Expectations vs. Reality: Performance and Nonperformance Issues in Oilfield Goods and Services Contracts*, 3 ROCKY MT. MIN. L. INST. 2-1, 2-2 (2013).

⁶ See Michael Pappas, *Energy Versus Property*, 41 FLA. ST. U. L. REV. 435 (2014); Troy A. Rule, *Property Rights and Modern Energy*, 20 GEO. MASON L. REV. 803 (2013). "The common law rules relating to trespass and other torts that are implicated in the use of longer

The current state of affairs points towards obtaining subsurface easements to avoid any potential liability or interference for subsurface horizontal wellbore movement across property boundaries; the most common suggestion among practitioners is for companies to obtain subsurface easements from *both* the surface and mineral owner for horizontal exploration.⁷ Yet all practitioners commenting on the issue are keenly aware that their recommendation is limited: because there are few cases directly dealing with whose permission must be sought in order to avoid liability,⁸ horizontal exploration companies—as well as interested mineral and surface owners—are venturing into territory in need of clarification.⁹ Some recent developments refine the problem, namely, attempts by state legislatures to define subsurface pore space ownership. Others cite a need to reevaluate outmoded property entitlements in light of modern technology to limit liability; for instance, suggesting that liability should only attach for substantial subsurface interference and damage, or through conceptualizing the deep subsurface as a “public commons” and not a private entitlement.¹⁰

This article is the first to provide a brief survey of the ways practitioners suggest obtaining permission for horizontal drilling operations while attempting to resolve the role subsurface easements play as one particular tension in the balance between traditional property conceptions, modern energy and technology, and the public interest in efficient oil and gas development. In analyzing subsurface easements, I argue courts should continue to adhere to traditional property entitlements—such as the right to exclude, the right to use, and the “residue” of the *ad coelum* doctrine—for both surface and mineral owners in horizontal drilling operations. While limiting liability through

and longer horizontal well laterals and hydraulic fracturing have come under siege. Some of those rules need to be changed.” Bruce M. Kramer, *Horizontal Drilling and Trespass: A Challenge to the Norms of Property and Tort Law*, 25 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 291, 338 (2014).

⁷ See Schweikhardt, *supra* note 2, at 353-54. “[A] subsurface easement should be obtained from the surface owners or their lessees of tracts between the drillsite and the bottom hole location to prevent a subsurface trespass. If the minerals have been severed from the surface, easements should also be obtained from the mineral owners and their lessor,” John W. Broomes, *Spinning Straw Into Gold: Refining and Redefining Lease Provisions for the Realities of Resource Play Operations*, 57 ROCKY MT. MIN. L. INST. 26-1, 26-15 (2011).

⁸ “I could find no case specifically dealing with the issue of who must grant a subsurface easement for a deviated well: the surface owner, the mineral owner, or the mineral owner’s lessee.” Warren J. Ludlow, *Property Rights Vs. Modern Technology: Finding the Right Balance in a World of Energy Shortages*, 1 ROCKY MT. MIN. L. INST. 14 (2005). “[I]t does not appear that any courts have yet been called upon to resolve the questions posed . . . regarding horizontal wellbore interference.” Broomes, *supra* note 7, at 26-15.

⁹ “The common law jurisprudence on multiple mineral development or split estates is still in its infancy.” Kramer, *supra* note 6, at 331.

¹⁰ See *infra* notes 71-95 and accompanying text.

reconceptualizing a more public subsurface presents one persuasive scheme for analyzing subsurface trespass issues, affirming existing private property entitlements provides a stable, “bright-line” means of safely developing horizontal drilling and maintaining efficient energy production.

Part I of this article will briefly address the horizontal drilling process in the United States and what practitioners identify as the relevant case law concerning ownership and liability issues related to horizontal drilling. Part I will also address the potential impact of recent pore space ownership legislation. Part II will discuss the merits and problems of four suggested approaches to obtaining easements in light of subsurface trespass and interference. Lastly, I will argue the need for courts to continue to uphold traditional property entitlements in addressing subsurface liability in horizontal drilling while policy makers should regulate inherent practical difficulties to further accommodate the needs of modern technology and energy.

I. HORIZONTAL DRILLING AND SUBSURFACE RIGHTS

A. Horizontal Drilling Basics

Horizontal drilling may be simply defined as the “process of drilling sideways from a vertical well.”¹¹ In conjunction with hydraulic fracturing, the technology has evolved into its current transformational role in American energy production.¹²

A horizontal drilling company first gains information about the depth of the hydrocarbon reservoir through drilling a conventional vertical well.¹³ The horizontal operation then drills vertically until, using careful measurements, the horizontal operator calculates the proper point where the drill bit turns into the reservoir.¹⁴ From this “kickoff point”, the lateral wellbore extends thousands of feet through the

¹¹ *What is Horizontal Drilling?*, Barnett Shale Energy Education Council, <http://bseec.org/sites/default/files/BSEEC-FactSheet-HorizontalDrilling.pdf>.

¹² *See generally New Developments in Upstream Oil and Gas Technologies: Hearing before the S. Comm. on Energy and Natural Resources*, 112th Cong. 1 (2011).

¹³ Rachel Curtis, *What is Horizontal Drilling and How Does it Differ from Vertical Drilling?*, Wilkes University, The Institute for Energy & Environmental Research for Northeastern Pennsylvania (Jan. 14, 2011), <http://energy.wilkes.edu/pages/158.asp>.

¹⁴ *Id.* “[A] wellbore is drilled vertically thousands of feet down into the shale, below the deepest fresh water aquifer . . . [the] downhole drilling motor then makes a 90-degree turn, which takes about a quarter of a mile to make the turn, and continues into the shale” Barnett Shale, *supra* note 11.

subsurface along the mineral formation in preparation for hydrocarbon capture.¹⁵

Once the desired bottom hole location is reached, the operator inserts production casing to prepare for hydraulic fracturing.¹⁶ A “frack job” injects water through the wellbore at high pressure into the hydrocarbon reservoir “to induce fractures or expand existing natural fractures and to carry [sand and ceramic] “proppants” into those fractures.”¹⁷ Fracturing increases the drainage area of the reservoir, creating greater productive capacity for the horizontal operation.¹⁸

B. Subsurface Implications

1. The *Ad Coelum* Doctrine Governs Traditional Rights Against Trespass

The *ad coelum* doctrine presents one foundation for traditional property rights; summarized, the doctrine provides that, to whomsoever the soil belongs, he owns also to the sky and to the depths.¹⁹ Following *ad coelum*, a fee simple owner purports to own the surface property as well as any subsurface space and formations.²⁰ The division between the mineral and surface estate is traceable to the doctrine,²¹ when the fee

¹⁵ Wozniak, *supra* note 3; “[The] objective is to expose significantly more reservoir rock to the wellbore surface than would be the case with a conventional vertical well penetrating the reservoir perpendicular to its plane of more extensive dimension.” *Directional Drilling Technology*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (Dec. 12, 2010), <http://www.epa.gov/cmop/docs/dir-drilling.pdf>;

¹⁶ Barnett Shale, *supra* note 11. While hydraulic fracturing is essential to horizontal drilling, “fracking” trespass issues are not the focal point of this article; trespass liability for hydraulic fracturing implicates traditional property rights, but will be avoided so as not to distract from a fuller subsurface easement analysis. *See Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1 (Tex. 2008); *But see Stone v. Chesapeake Appalachia, LLC*, 5:12-CV-102, 2013 WL 2097397 (N.D.W. Va. Apr. 10, 2013) vacated, 5:12-CV-102, 2013 WL 7863861 (N.D.W. Va. July 30, 2013).

¹⁷ Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 118 (2009).

¹⁸ “[H]ydraulic fracturing is absolutely necessary to profitably develop oil and gas from shale rock formations and other “tight” formations.” David E. Pierce, *Developing A Common Law of Hydraulic Fracturing*, 72 U. PITT. L. REV. 685 (2011).

¹⁹ “Sir Edward Coke once gave utterance to the statement that ‘*cujus est solum, ejus est usque ad coelum*,’ which, taken literally, means that he who owns the soil owns upward unto heaven.” RESTATEMENT (SECOND) OF TORTS § 159 cmt. g (1965).

²⁰ J. Thomas Lane et al., *Ownership and Use of Underground Space*, 32 E. MIN. L. FOUND. § 23.04, § 23.04(3) (2011).

²¹ “The rule provides the foundational basis for common law mineral rights in the United States, allocating private ownership interests in coal and other stationary subsurface mineral deposits to the owners of surface land immediately above those resources.”

owner “severs” minerals from the surface.²² An unsevered mineral estate owner, under the doctrine, owns property rights as a proverbial “bundle of sticks” in the mineral estate, retaining, for instance, the right to lease or produce oil and gas from the property, subject to the “rule of capture.”²³

The theoretical “rule of capture” does not protect against liability from subsurface trespass.²⁴ In the oil and gas context, a trespass occurs when a well is bottomed on the land of another without consent, whether intentional or unintentional.²⁵ Subsurface trespass accompanies the drilling of directional wells without permission from the proper owner.²⁶ The liability and damages stemming from a subsurface trespass may depend on the good faith or bad faith conversion of oil and gas from the neighbor’s land; the trespassing operation may also be enjoined.²⁷

2. *Ad Coelum* Refined in *United States v. Causby*

The Supreme Court significantly limited the *ad coelum* doctrine in the airspace context in *United States v. Causby*.²⁸ In *Causby*, the Court likened airspace to a “public highway” in which the surface owner only controls the immediate reaches of the atmosphere, or as much space above that the landowner can reasonably use.²⁹ The Court stated *ad coelum* “has no place in the modern world,” or else every overhead airplane flight would risk a trespass.³⁰ The landowner still holds some small, limited private airspace rights,³¹ but aircraft may utilize the air

Rule, *supra* note 6, at 806.

²² “[T]he *ad coelum* principle invests the surface estate owner with the capacity to sever the sub-surface minerals from the surface estate and create a separate mineral estate.” Samantha Hepburn, *Does Unconventional Gas Require Unconventional Ownership? An Analysis of the Functionality of Ownership Frameworks for Unconventional Gas Development*, 8 PITT. J. ENVTL. PUB. HEALTH L. 1, 10 (2013) (citation omitted).

²³ Derek Cook & Jennie K. Martin, *Oil and Gas Basics: Understanding the Sticks to Avoid Stones and Broken Bones*, 76 TEX. B.J. 319 (2013). The “rule of capture” provides that the mineral owner or lessor may drill his or her own tract and recover, without any liability, any oil and gas that may migrate from neighboring tracts. Lane, *supra* note 20, at § 23.04(6).

²⁴ “[A] trespass may be committed on, beneath, or above the surface of the earth.” RESTATEMENT (SECOND) OF TORTS § 159 (1965).

²⁵ Howard R. Williams & Charles J. Meyers, Williams & Meyers, *Oil and Gas Law* § 227 (Patrick H. Martin & Bruce M. Kramer, eds. 2013) (1959).

²⁶ *Id.*

²⁷ *Id.*; Owen L. Anderson, *Lord Coke, the Restatement, and Modern Subsurface Trespass Law*, 6 TEX. J. OIL GAS & ENERGY L. 203, 215-17 (2011) (detailing means for calculating damages in subsurface trespasses).

²⁸ *United States v. Causby*, 328 U.S. 256 (1946).

²⁹ *Id.* at 264.

³⁰ *Id.* at 260-61.

³¹ See generally Troy A. Rule, *Airspace and the Takings Clause*, 90 WASH. U.L. REV. 421, 428 (2012).

“public domain” subject only to government regulation; liability to surface owners exists solely for flights so low and frequent that cause direct and immediate interference with landowner enjoyment.³²

3. Pore Space Designation and Development

While there is some ambiguity, commentators generally accept that the owner of a surface estate also owns the subsurface pore space.³³ Under such consensus, a fee simple owner certainly owns the subsurface estate,³⁴ while case law involving severed mineral estates points to surface estate pore ownership, with the mineral owner possessing subsurface rights in specific contexts.³⁵ A number of states have attempted to designate pore space ownership through legislative action.³⁶ Pore space development is important to facilitate carbon sequestration efforts aimed at combating climate change, while also refining the ambiguity inherent in common law subsurface ownership.³⁷

4. Directional Wellbore Passage Through Unpooled Tracts

From the principle that any unauthorized movement through another’s subsurface constitutes a trespass, a handful of courts have examined whose permission is necessary to allow the passage of a directional wellbore across a neighboring tract en route to the hydrocarbon reservoir.³⁸ Increased horizontal drilling boosts the potential for future subsurface trespass and interference cases involving unpooled tracts.³⁹

³² *Causby*, 328 U.S. at 266-67.

³³ “Ownership of pore space by the surface owner is considered the majority view in the United States.” Jean Feriancek, *Resolving Ownership of Pore Space*, 26 NAT. RESOURCES & ENV’T 49 (2012).

³⁴ *See, e.g.*, *Emeny v. United States*, 412 F.2d 1319 (the federal government, under an oil and gas lease, could not inject helium into the subsurface of land owner in fee simple).

³⁵ *See Lane, supra* note 20, at § 23.04(4)(c) (citing cases).

³⁶ Wyo. Stat. Ann. § 34-1-152(a) (West); N.D. Cent. Code Ann. § 47-31-03 (West).

³⁷ “CCS [carbon capture and storage] involves capturing CO₂ from power generation and industrial processes, transporting the CO₂ to an area with suitable geology, and injecting it into deep geologic formations, sequestering the CO₂ underground for long periods of time.” Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, 2010 U. ILL. L. REV. 363, 364 (2010).

³⁸ *See supra* notes 19-27 and accompanying text.

³⁹ There is established law that directional drilling in “pooled” or “unitized” acreage does not require permission of the pooled mineral or surface owner through whose subsurface the drill passes. *See, e.g.*, *Cont’l Res., Inc. v. Farrar Oil Co.*, 1997 ND 31, 559 N.W.2d; *Nunez v. Wainoco Oil & Gas Co.*, 488 So. 2d 955 (La. 1986).

a. Humble Oil & Refining Co. v. L. & G. Oil Co.

In *Humble Oil & Refining Co. v. L. & G. Oil Co.*, the Texas Court of Civil Appeals suggested that permission from the mineral owner or lessee is only necessary if drilling interfered with the mineral lessee's right to produce minerals.⁴⁰ The Texas Railroad Commission granted defendants permission to drill two directional wells using a one-acre, off-lease tract purchased to drill to the permit location; Humble Oil, the mineral lessee of the one-acre tract, attempted to enjoin defendants from drilling through its mineral lease in order to access the lease.⁴¹ Humble Oil did not argue that it intended to produce minerals from the surface site immediately, but that it may do so in the future.⁴² The court remarked that whether the drilling interfered with the lessee's rights was a question of fact, but conceded to the trial court which denied the injunction and found no interference.⁴³ The Texas Court of Civil Appeals further established the present "interference" needed for the lessee to enjoin the surface operator in *Atlantic Refining Co. v. Bright & Schiff*: the court stated the lessee "must prove that he needs the surface at the time and place then being used by the other user."⁴⁴

b. Chevron Oil Co. v. Howell

In contrast to *Humble*, the Texas Court of Civil Appeals in *Chevron Oil Co. v. Howell* upheld an injunction for a directional well entering plaintiff's—Magna Oil Corporation—lease and bottomed on acreage leased by Chevron Oil because the court assumed subsurface passage resulted in mineral formation damage.⁴⁵ The plaintiff Howell, who owned the leased surface land and served as Magna Oil's Vice-President, had not given Chevron permission to penetrate the subsurface; Chevron claimed to operate under a license granted by the United States Government to access both the surface and subsurface.⁴⁶ Chevron appealed the injunction claiming the drilling operation did not interfere with the lessee's mineral rights and that "there is no competent evidence of damage . . . to any oil, gas or mineral formation under the

⁴⁰ *Humble Oil & Ref. Co. v. L. & G. Oil Co.*, 259 S.W.2d 933, 938 (Tex. Civ. App. 1953).

⁴¹ "[A]ppellant alleged that the entry on a one acre tract of land under the permit is a violation of its vested property and legal rights, it being the owner of an oil, gas and mineral leasehold estate on lands inclusive of said one acre tract." *Id.* at 934.

⁴² *Id.* at 938.

⁴³ *Id.*

⁴⁴ *Atl. Ref. Co. v. Bright & Schiff*, 321 S.W.2d 167, 169 (Tex. Civ. App. 1959).

⁴⁵ *Chevron Oil Co. v. Howell*, 407 S.W.2d 525 (Tex. Civ. App. 1966).

⁴⁶ *Id.* at 526.

surface.⁴⁷ The Court denied Chevron’s appeal by finding damage based on testimony that “to drill the hole is to damage the formation—‘any time you drill into something there is bound to be some damage.’”⁴⁸

How can and will courts decide between *Humble* and *Chevron* in future cases? There was no substantial proof of damage to the subsurface in *Chevron*, though the court perhaps implied that any subsurface penetration without permission constitutes a trespass.⁴⁹ In contrast, the *Humble* court required a “showing of interference with the rights of the mineral owner or lessee.”⁵⁰ “Interference” as drainage from the adjacent mineral estate without a showing of directional drilling interference—and following the reasoning applied in *Humble* and elucidated in *Atlantic Refining*—will not constitute a trespass because the operator is protected by the “rule of capture.”⁵¹ Following *Hancock* however, any drilling through leased acreage constitutes trespass, regardless of consent.⁵²

c. Lightning Oil Co. v. Anadarko E&P Onshore, LLC

The Texas Court of Civil Appeals in *Lightning Oil Co. v. Anadarko*, though pending trial, provided perhaps one first look at how courts may decide future subsurface trespass and interference issues in horizontal drilling.⁵³

In *Lightning Oil*, Lightning owned minerals in a severed estate with the surface estate owned by Briscoe Ranch, Inc.⁵⁴ Lightning Oil also owned minerals, along with the Texas government, in the Chapparral Wildlife Management Area, adjoining the Briscoe Ranch mineral estate. Anadarko obtained a mineral lease from the Texas government to explore for minerals under Chapparral WMA and planned to drill one horizontal

⁴⁷ *Id.* at 527-28.

⁴⁸ *Id.* at 528. *See also* *Hancock Oil Co. v. Meeker-Garner Oil Co.*, 257 P.2d 988, 992 (Cal. Ct. App. 1953) (“one who drills through leased land to cause drainage from it violates the lessee’s rights and commits a trespass against him. Such conduct being a trespass against the lessee, it can make no difference that the owner-lessor has consented”).

⁴⁹ “*Chevron* can be argued as authority for an injunction by the mineral lessee An injunction should only be granted upon showing of a real and substantial damage to the producing formation, and not on the superficial dicta in *Chevron* that any penetration will do damage to the producing formation.” Carroll G. Martin, *Yours, Mine, and Ours: Conflicts Between Mineral and Surface Estates*, 46 ROCKY MT. MIN. L. INST. 19, § 19.03(1)(c) (2000).

⁵⁰ *Id.* “[T]he holding of [*Chevron*] is sensible because *Chevron* did not have permission to access the surface. However, the reasoning is troubling.” Wozniak, *supra* note 3, at 11-25.

⁵¹ “This is logical because the drainage caused by the deviated well is no greater than drainage that would have been caused by a well with a surface location on the same tract as the bottom hole location.” Martin, *supra* note 49, at § 19.03(1)(c).

⁵² *Hancock Oil Co.*, 257 P.2d at 992.

⁵³ *Lightning Oil Co. v. Anadarko E & P Onshore, LLC*, No. 04-14-00152-CV, 2014 WL 5463956 (Tex. App. Oct. 29, 2014).

⁵⁴ *Id.* at *1.

well, with others to follow, into the Chapparal estate from a surface location on Briscoe Ranch: the horizontal wellbore passing through the Lightning owned minerals to reach the Chapparal lease.⁵⁵ Lightning sought an injunction to prevent Anadarko from drilling through its mineral estate, asserting that the proposed Anadarko well would interfere and substantially harm Lightning's plans for future wells, which the trial court denied.⁵⁶

On interlocutory appeal, the Appeals Court did not address whether Anadarko's proposed actions constituted a trespass, but only whether the court should grant Lightning a temporary injunction.⁵⁷ The Appeals Court determined that because Lightning failed to produce evidence that Lightning would suffer "probable, imminent, and irreparable" injury from Anadarko's first proposed well through Lightning's mineral estate, Lightning was not entitled to a temporary injunction.⁵⁸ The Court remarked that Lightning showed "a potential for injury to Lightning's mineral interests in the future," but not of the degree permitting an injunction.⁵⁹

II. ANALYZING TRADITIONAL AND MODERN APPROACHES TO SUBSURFACE EASEMENTS

The subsurface easement issue in the horizontal drilling context may encompass a variety of operational possibilities, but the most common scenario envisioned by practitioners involves horizontal drilling across unpooled property tracts owned by separate owners.

A. Protecting Traditional Property Entitlements of Surface and Subsurface Owners

1. Easements From Both Surface and Subsurface Owners

The first approach to the permission and trespass issues outlined above suggests that the operator should obtain easements from both the surface and subsurface mineral owner and lessees. Primarily, by seeking both easements, the operator can avoid liability by avoiding potential

⁵⁵ "Anadarko obtained permission from Briscoe Ranch, the surface owner, and entered into a written Surface Use and Subsurface Easement Agreement allowing it to establish drill sites for horizontal wells that will enter and cross through Lightning's Mineral Estate." *Id.*

⁵⁶ "The trial court found that Anadarko's conduct may constitute a trespass into Lightning's mineral rights, but, based on the evidence presented, 'there is no interference' with Lightning's mineral interests." *Id.* at *2.

⁵⁷ *Id.* at *3.

⁵⁸ *Id.* at *5.

⁵⁹ *Id.*

trespass for a question that has not yet been adequately addressed by the judiciary or legislature.⁶⁰ The scheme is helpful as it emphasizes traditional conceptions of property ownership—the right to exclude and the right to develop minerals beneath the surface—to avoid common law trespass liability.⁶¹ While case law and pore space designation points to the proposition that the surface owner owns and may develop the substrata of property,⁶² the possibility that a wellbore will interfere with the right to develop the mineral estate favors the operator obtaining protection from both surface and subsurface owners while all interested parties wait for direct future guidance from higher authorities.⁶³ This route has been commonly espoused among practitioners as it avoids liability at the expense of squarely answering the issue.⁶⁴

2. Easements from Surface or Subsurface Owner

The second approach tailors the subsurface easement issue to persuasive common law or specific state statutory property conceptions. The most compelling argument in this scheme is to obtain some easement solely from the surface owner, following *Humble* or *Lightning Oil*, as long as there is no interference with the mineral owner's right to develop the tract through which the wellbore passes.⁶⁵ Further, in states that have adopted legislation that vest pore space ownership in the surface owner, the operator should specifically look to the surface owner to obtain a subsurface easement.⁶⁶ Another counterview, following the analysis outlined in *Chevron*, holds that the operator should look to the mineral

⁶⁰ See *supra* notes 7-9 and accompanying text.

⁶¹ “[A] party seeking an off-lease surface location might do well to preemptively resolve the issue by ensuring that the surface owner and the mineral owner (or his lessee) of the proposed drill-site tract all enter into agreements and/or easements authorizing the project.” Broomes, *supra* note 7, at 26-15.

⁶² See *supra* notes 33-37 and accompanying text.

⁶³ “To be fully protected, then, an explorer would obtain easements from every owner, both surface and mineral, of each tract in which the proposed well will penetrate before it reaches its bottom hole location.” Ludlow, *supra* note 8.

⁶⁴ See Gordon T. Whitman, *Five Things That Every Texas Energy Lawyer Should Know About Louisiana Oil and Gas Law*, 52 ANN. INST. ON MIN. L. 14 (2005) (further discussing lack of judicial guidance on whether subsurface easements should be granted from all co-tenants).

⁶⁵ “[A]n easement from the surface owner may prove sufficient in most situations unless there is a likelihood that passage through the off-unit subsurface could interfere with production from these lands.” John W. Morrison & Wade C. Mann, *Reservoir Development: Competing Rights of Horizontal and Vertical Developers and Other Oddities of Vertical Legal Principles Gone Sideways*, 58 ROCKY MT. MIN. L. INST. 11-1, 11-25 (2012).

⁶⁶ “[T]he operator's intrusion into the pore space may create trespass liability unless the operator obtains a subsurface easement or other contractual mechanism allowing it to drill through the pore space.” Wozniak, *supra* note 3, at 11-24.

owner for an easement because the passage of the wellbore through the subsurface creates a presumption that both interference with the right to develop and damage to the mineral reservoir has occurred.⁶⁷ Determining subsurface ownership through a statutory pore space designation may be the approach of the future as carbon sequestration efforts increase; yet, the time period in which such statutory measures materialize is unknown as horizontal drilling operations continue unabated and liability questions remain unresolved.⁶⁸ Moreover, a court may still tie pore space determinations to common law principles.⁶⁹ Further, when elucidating the subsurface easement issue by advocating one specific approach, the courts could, and may likely, “catch up” and render one method moot.⁷⁰

B. Accommodating Modern Energy by Limiting Private Entitlements

1. Subsurface Trespass for Only Substantial Damage

The third approach protects exploration companies by limiting liability to surface and mineral owners for only egregious subsurface trespass situations upon proof of substantial damage or interference with the mineral estate. This view moves away from traditional, *ad coelum*, property conceptions in favor of likening the subsurface to overhead airspace.⁷¹ For this approach, there would be no subsurface trespass “against the mineral owner unless the mineral owner suffers actual and substantial harm beyond drainage—such as where the location of the well or wellbore leaves no suitable well or wellbore location for the

⁶⁷ The mineral owner solution may embrace two solutions: the first is the mineral owner may only enjoin the operation upon showing surface owner activity will interfere with the right to develop. The second places a presumption that the mineral estate is burdened when the wellbore crosses the mineral owner subsurface creating “an unreasonable interference that may be enjoined.” Kramer, *supra* note 6, at 331.

⁶⁸ The pore space or reservoir used . . . [is] owned by different persons or entities. The inability of the . . . operator to obtain leases or consent from the owners of all tracts may lead to liability concerns or claims of trespass” Feriancek, *supra* note 33, at 50.

⁶⁹ The principle that “the mineral owner has an implicit right of reasonable use to facilitate enjoyment of mineral rights” complicates the surface owner pore space designation. R. Lee Gresham & Owen L. Anderson, *Legal and Commercial Models for Pore-Space Access and Use for Geologic CO₂ Sequestration*, 72 U. PITT. L. REV. 701, 709-10 (2011).

⁷⁰ “[R]esolving the [pore space] ownership issue does not necessarily resolve the question of whether a particular use of the surface or subsurface is legal even where consent from the owner is obtained.” Kramer, *supra* note 6, at 296.

⁷¹ “[T]echnological advancements in deep subsurface horizontal drilling and reservoir stimulation techniques that may encroach upon another's subsurface, once as inconceivable as airplanes encroaching upon another's airspace, are now so commonplace that courts must consider whether these and other deep subsurface activities can give rise to an action in trespass.” Anderson, *supra* note 27, at 204.

mineral owner to exploit the minerals beneath.”⁷² In this arrangement, courts are instructed to allow the operator to drill from an off-lease surface to the leased mineral reservoir “without securing permission from either the surface or mineral owner so long as the well bore is not perforated to produce hydrocarbons directly.”⁷³

The “substantial damage” standard limits the potential for enjoined operations and provides an answer for liability if a subsurface mineral owner seeks to bar access—countering the “strict application of trespass law to the subsurface” that could implicate whether or not horizontal drilling is “an economic enterprise.”⁷⁴ Further, the approach follows the sensible analysis provided by the *Humble* court that recognizes trespass for only substantial interference with the mineral owner’s right to develop.⁷⁵

Such a seemingly unauthorized movement through the subsurface may constitute a taking;⁷⁶ commentators therefore appropriately recognize that the *Causby* refinement of *ad coelum* may not fit as neatly in the subsurface context.⁷⁷ Likening the subsurface movement to the passage of an airplane overhead accommodates modern energy by limiting trespass to only instances of substantial interference.⁷⁸ However, in this scheme, policy makers should discern that subsurface intrusion *is* clearly distinguishable from airspace travel.⁷⁹ For instance, subsurface ownership is usually held by a specific number of property owners; further, any intrusion will likely last “for a substantial period of time.”⁸⁰ Payment of compensation for airspace intrusion, in contrast, is impractical because the intrusion, in virtually all instances, is remote and fleeting.⁸¹

⁷² *Id.* at 220.

⁷³ *Id.* at 225.

⁷⁴ “If traditional surface trespass law is applied to the subsurface, numerous subsurface uses could be greatly hindered, if not made impracticable.” Owen L. Anderson, *Subsurface “Trespass”: A Man’s Subsurface Is Not His Castle*, 49 WASHBURN L.J. 247, 281 (2010)

⁷⁵ See *supra* notes 40-44, 49-52 and accompanying text.

⁷⁶ The Fifth Amendment establishes private property shall not be taken for public use without compensation. U.S. CONST. amend. V.

⁷⁷ Among the distinguishing factors are the historical and continuing severance, sale, and marketing or subsurface rights, the compelling public interest in air travel versus “multiple competing subsurface uses,” and government authorization of airspace travel. Gresham, *supra* note 69, at 717.

⁷⁸ “Accordingly, just as the Restatement preserves an actionable trespass where an aircraft causes actual damages, the rule should support a claim for trespass where a deep subsurface invasion ‘interferes substantially with the other’s use and enjoyment of his land.’” Anderson, *supra* note 27, at 206.

⁷⁹ *Id.*; Jacqueline P. Hand & James C. Smith, *Neighboring Property Owners, Subsurface Invasions* § 3:10 (2014).

⁸⁰ *Id.*

⁸¹ *Id.*

2. Designate Private Subsurface as a “Public Commons”

The final scheme vests subsurface pore space ownership in the public and dispenses with private conceptions of subsurface rights.⁸² The approach has often been cited from a compelling public interest in enabling a nationwide carbon sequestration program in an attempt to combat global climate change.⁸³ Because the common law has not adequately addressed pore space ownership, “the pore space should be seen as a public resource, similar to the navigable airspace.”⁸⁴ As *Casubly* limited *ad coelum*, subsurface private entitlements should give way to the government as “the ‘most useful manager’ of the pore space in the CCS context” because private owners are too numerous to “effectively operate and allocate the storage resource.”⁸⁵ Furthermore, public pore space ownership would not necessarily impact mineral development if private subsurface uses are legislatively prioritized.⁸⁶

Public ownership rationally conceptualizes rejecting *ad coelum* subsurface ownership in the sense that humans make only the slightest use of the earth’s crust and American law has never determined ownership more than two miles below the surface.⁸⁷ Proponents recognize that, in the oil and gas context, the principles governing *ad coelum* have been significantly eroded by, for instance, the rule of

⁸² “[C]ommon law rules are increasingly modified by statutes that promote governmental intervention in oil and gas production at the expense of traditional property rights.” John G. Sprankling, *Owning the Center of the Earth*, 55 UCLA L. REV. 979, 1010 (2008) (citing injection well permit requirements, pooling or unitization requirements). Such statutes “effectively amend the general concept of ownership of the subsurface by the surface owner of the land because that owner cannot rely on a concept of individual ownership to thwart the common right to the resource.” *Id.* (internal citations omitted).

⁸³ “To further the development of [carbon sequestration] as a public good providing national benefits, traditional property conceptions must give way to modern realities” James Robert Zadick, *The Public Pore Space: Enabling Carbon Capture and Sequestration by Reconceptualizing Subsurface Property Rights*, 36 WM. & MARY ENVTL. L. & POL’Y REV. 257, 272 (2011); “[F]ederal ownership of pore space could arguably reduce the transaction costs associated with project development, thereby facilitating the rapid scaling of commercial geologic carbon storage projects.” Kevin L. Doran & Angela M. Cifor, *Does the Federal Government Own the Pore Space Under Private Lands in the West? Implications of the Stock-Raising Homestead Act of 1916 for Geologic Storage of Carbon Dioxide*, 42 ENVTL. L. 527, 531 (2012).

⁸⁴ Zadick, *supra* note 83, at 269.

⁸⁵ *Id.* at 276.

⁸⁶ While “[b]eneficial deep subsurface uses almost uniformly involve mineral extraction,” carbon sequestration is most efficient in subsurface spaces such as old oil and gas fields, saline aquifers, and unmineable coal seams, such that “conflicts with resource extraction could be minimized.” *Id.* at 275.

⁸⁷ Sprankling, *supra* note 82, at 1020.

capture, pooling and unitization, and state regulatory practices.⁸⁸ The subsurface right to exclude has been further diminished in cases such as the Texas Supreme Court’s famous decision, *Coastal Oil v. Garza*.⁸⁹ In this scheme, an owner's rights, respecting reasonably foreseeable use, should perhaps extend only 1,000 feet below the surface, with an exception honoring mineral rights; the space below could be owned by the government.⁹⁰

If existing mineral entitlements were somehow respected under a public commons approach, surface and mineral owners still may face a number of issues. Plainly, if the government owns the subsurface space, private property owners would be “deprived of their ability to profit” from subsurface space, inviting “takings” claims.⁹¹ Arguably, the deep subsurface conducive to carbon sequestration falls outside “private beneficial use” and “[p]rivate, atomistic ownership of the pore space has little inherent economic utility;”⁹² however, the public approach might be impractical based on the potential “volume and magnitude of takings proceedings” while attempting to provide private owners adequate compensation.⁹³ Conceivably, a public pore space program, accomplished through eminent domain, would not properly compensate private property owners—who may make reasonable and valuable use of the subsurface—for carbon sequestration efforts.⁹⁴ Moreover, a public commons approach may prove problematic because some courts *do* “recognize absolute property rights in subsurface trespass cases”

⁸⁸ *Id.* at 1008-10.

⁸⁹ *Id.* at 1016-18. “The foundation for these decisions is the public policy encouraging oil and gas production, which outweighs an owner’s traditional right to exclude.” *Id.* at 1018. *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 11 (Tex. 2008) (“that maxim—*cujus est solum ejus est usque ad coelum et ad inferos*—‘has no place in the modern world’”).

⁹⁰ Sprankling, *supra* note 82, at 1021.

⁹¹ Tracy J. Logan, *Carbon Down Under-Lessons from Australia: Two Recommendations for Clarifying Subsurface Property Rights to Facilitate Onshore Geologic Carbon Sequestration in the United States*, 11 SAN DIEGO INT’L L.J. 561, 587-88 (2010); “Such a property-rights adjustment would . . . disproportionately burden owners in lands conducive to CCS, denying them just compensation for the use and occupation of their subsurface areas without providing any unique benefits to them in return.” Rule, *supra* note 6, at 822.

⁹² Zadick, *supra* note 83, at 278.

⁹³ Logan, *supra* note 91, at 588.

⁹⁴ “The right to exclude from one's private property is essential to the American way. If a benefit is derived from the use of subsurface property for carbon dioxide storage, those who produce pollution ought to pay to receive that benefit.” Sarah Anne Lishman, *Deep in the Heart of Texas: How Carbon Sequestration Will Affect Valuation of the Subsurface*, 45 ST. MARY’S L.J. 283, 330 (2014).

reflecting “established and complicated” subsurface entitlements.⁹⁵

III. GRANTING SUBSURFACE EASEMENTS

A. *Protecting Operator Liability While Respecting Common Law Rights*

Courts will soon provide some clarity to the subsurface easement issue in horizontal drilling operations. In the interim, for parties involved in horizontal oil and gas exploration, easements should—at the least—be obtained from surface owners and also from mineral owners through which the wellbore moves in order to fully avoid common law trespass and interference issues.⁹⁶ As a practical matter, courts have not provided guidance on this issue, and operators may effectively limit liability.⁹⁷ A number of trends should continue to refine this approach: primarily, state statutory designation of the subsurface pore space may lend credence to the position that surface owners grant permission for the wellbore to traverse the subsurface.⁹⁸ Second, courts will likely, and should, attach liability for only substantial damage or interference with the mineral estate, as suggested by Professor Anderson and *Humble*, over the dated analysis provided in *Chevron*.⁹⁹ Likewise, continuing strong state regulatory systems for oil and gas exploration, including proper spacing and permitting requirements, will minimize potential horizontal trespass and interference issues and protect correlative rights.

B. *Need for Adherence to the Ad Coelum Doctrine*

As it relates to obtaining subsurface easements, courts and the industry should acknowledge and affirm the viability of the *ad coelum* doctrine in the oil and gas context. *Coastal Oil v. Garza*, mentioned briefly, threw convention into question regarding subsurface trespass and liability in light of horizontal drilling and hydraulic fracturing in remarking *ad coelum* “had no place in the modern world.”¹⁰⁰ Yet, courts

⁹⁵ Matthew J. Lepore & Derek L. Turner, *Legislating Carbon Sequestration: Pore Space Ownership and Other Policy Considerations*, 40 COLO. LAW 61, 65 (2011).

⁹⁶ See *supra* notes 60-64 and accompanying text.

⁹⁷ *Id.*

⁹⁸ See *supra* notes 33-37 and accompanying text.

⁹⁹ See *supra* notes 71-75 and accompanying text.

¹⁰⁰ *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 11 (Tex. 2008). The Court specifically stated that the law of trespass need not extend more than two miles below the subsurface because Lord Coke, just as he could not imagine airplanes, neither could he fathom petroleum exploration. *Id.*

continue to deal with subsurface trespass and ownership disputes while respecting *ad coelum* rights in the subsurface.¹⁰¹

At the least, courts continue and should recognize *ad coelum* as it provides some degree of certainty in subsurface rights and ownership. For instance, in *Alyce Gaines v. El Paso*, the dispute centered upon whether an existing lease’s granting clause allowed or prohibited the opportunity for the plaintiff to lease for other exploration at greater subsurface depths.¹⁰² The *ad coelum* doctrine analysis was instrumental in resolving the case as a “landowner may convey, reserve or lease his rights to explore and develop his *land* for production of minerals and reduce them to possession” when the granting clause is unrestricted.¹⁰³ When land has a specific and defined meaning, as accomplished in affirming *ad coelum*, both public and private owners are aware of their rights and obligations to one another.¹⁰⁴

Perhaps more importantly, the “residue” of the *ad coelum* doctrine proves its resiliency in the oil and gas context because it provides the means in which the mineral estate is severed, held, and marketed.¹⁰⁵ If policy makers attempt to diminish traditional subsurface conceptions through a “public commons” doctrine, the oil and gas industry, property owners, commentators, and practitioners may forego the stability and certainty *ad coelum* provides. While a “public commons” approach could, admittedly, make an exception for mineral entitlements, policy makers should weigh whether certainty, especially dealing with severing and

¹⁰¹ See *Stone v. Chesapeake Appalachia, LLC*, 5:12-CV-102, 2013 WL 2097397 (N.D.W. Va. Apr. 10, 2013) vacated, 5:12-CV-102, 2013 WL 7863861 (N.D.W. Va. July 30, 2013) (“under [the *Garza*] rule, the companies may tell a small landowner that either they sign a lease on the company’s terms or the company will just hydraulically fracture under the property and take the oil and gas without compensation”); *Faith United Methodist Church & Cemetery of Terra Alta v. Morgan*, 231 W. Va. 423, 745 S.E.2d 461 (2013) (“a land owner with a fee simple title owns everything over the land and under it to the center of the earth”); *Energy Dev. Corp. v. Moss*, 214 W. Va. 577, 585 (2003) (“[t]hus we are considering the case of a lessor who owned from the heavens to the center of the earth”).

¹⁰² *Alyce Gaines Johnson Special Trust v. El Paso E & P Co., L.P.*, 773 F. Supp. 2d 640, 642-43 (W.D. La. 2011).

¹⁰³ *Id.* at 645.

¹⁰⁴

“Land . . . has a specific and defined meaning. . . . Unless otherwise provided by law, the ownership of a tract of land carries with it the ownership of everything that is directly above or under it. . . . As the Louisiana Civil Code makes clear Louisiana property law embraces the colorful Latin maxim of *cujus est solum ejus est usque ad coelum et ad inferos* (“for whoever owns the soil, it is theirs up to Heaven and down to Hell”).

Id.

¹⁰⁵ *Id.*

marketing minerals, would be affected, along with the potential headache in private takings claims.¹⁰⁶ Secure property law and title in mineral estates, as an outgrowth of *ad coelum*, promotes efficient energy development more than drastically (though rationally) reconceptualizing the subsurface.

C. Practical Considerations in Respecting Easements and Entitlements

Where courts should and will likely not unmoor themselves from traditional property entitlements, policy makers can acknowledge and remedy practical difficulties in obtaining subsurface easements as needed.

For instance, the primary difficulty in securing easements from the surface, but especially the mineral estate, is obtaining consent from multiple, fractionalized co-tenants. Because traditional property analysis suggests that easements may only be granted upon agreement of all property co-tenants, operators admittedly face the burden in obtaining consent.¹⁰⁷ For instance, if a mineral owner is asked for a subsurface easement, he may decline because drainage from “his” subsurface minerals is likely.¹⁰⁸ If the oil company cannot obtain the easement, horizontal exploration and the public interest in energy development is effectively stymied.

Co-tenancy concerns with subsurface easements may be allayed somewhat; first, if the risk of drainage or interference with use is low or non-existent, property owners would and should have no issue granting subsurface easements for a reasonable price. Second, the operator must already obtain permission for surface use from all surface owners in acquiring the drill site.¹⁰⁹ Further, operators may include subsurface easement rights or language in leases with mineral owners permitting future wellbore passage.¹¹⁰ However, all things considered, policy makers may consider regulation requiring the operator to gain the consent of a

¹⁰⁶ “Demolition is easier than construction. If we accept the premise that the center of the earth orthodoxy must be abandoned, then the difficult question is what should replace it.” Sprankling, *supra* note 82, at 1039.

¹⁰⁷ Ludlow, *supra* note 8; *See, e.g.*, Texas Mortgage Co. v. Phillips Petroleum Co., 470 F.2d 497, 499 (5th Cir. 1972) (“It is well settled that a tenant in common cannot, without the precedent authority or subsequent ratification of his cotenants, impose an easement or dedication upon the common property in favor of a third party”).

¹⁰⁸ “Due to the proliferation of fractional mineral ownership, obtaining unanimous consent would be often difficult and costly, if not impossible in many situations, especially because mineral owners have a natural incentive to deny access due to the drainage they might suffer.” Anderson, *supra* note 74, at 263.

¹⁰⁹ *See supra* note 55 and accompanying text.

¹¹⁰ “[L]essee[s] are starting to include ‘subsurface easement’ language in their leases as an exhibit to the lease form.” Whitman, *supra* note 64, at 18.

lower percentage of co-tenants as one means of easing the burden of dealing with fractionalized mineral or surface interests.¹¹¹ Addressing subsurface easements in such a way is one example of the balance regulators can strike between accommodating modern energy while respecting common law property rights.

CONCLUSION

Where hydraulic fracturing stands as the likely arena in which subsurface rights may be “reshuffled,”¹¹² horizontal wellbore passage also implicates subsurface liability issues where subsurface trespass and interference occurs. As horizontal exploration continues to boom, courts will carefully weigh the burdens presented between competing surface and mineral estate uses; though surface owners trend to lay claim to subsurface pore space and easement grants absent substantial damage or interference with the mineral estate.

Where exploration tends to concede to modern energy and the public’s regulatory interest, surface and mineral owners may expect future limits on the power to grant subsurface easements.¹¹³ While a healthy balance between respecting traditional entitlements and accommodating modern energy should be encouraged, policy makers should carefully consider, as discussed above, the judiciary’s continued adherence to the *ad coelum* doctrine in the subsurface context: subsurface *ad coelum* may be practical fiction, but a useful fiction, nonetheless. Both property owners and the oil and gas industry would be well served though effective regulation balancing the realities of horizontal drilling and hydraulic fracturing with the complexities and inertia present in traditional property law—better minds will know when and where to implement the right mix of liability and property rules in this evolving and exciting legal arena.

¹¹¹ *Id.*

¹¹² Rule, *supra* note 6, at 826-28.

¹¹³ *Id.*