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Keith B. Hall*

Hydraulic Fracturing: If Fractures Cross Property Lines is there an Actionable Subsurface Trespass?

ABSTRACT

The law recognizes trespass liability for subsurface intrusions, at least in some circumstances. Further, courts sometimes have stated that ownership of land extends to the earth's center. But such statements are dicta. Few courts have carefully considered the maximum extent of subsurface ownership or subsurface trespass liability. Courts in two jurisdictions have recently addressed whether a person incurs liability when he causes hydraulic fracturing fluid to intrude into the subsurface of a neighbor's land, but the courts reached opposite conclusions, with each suggesting that public policy supported its position. Neither adequately examined the legal issues. Careful consideration of trespass concepts demonstrates that a person should not incur liability for such intrusions unless he designed the fractures to extend beneath the neighbor's land or the fractures extended further beneath the neighbor's subsurface than the maximum typical discrepancy between planned and actual fracture lengths. Further, this result serves the public policy concerns addressed by each court that recently addressed this issue.

INTRODUCTION

The use of hydraulic fracturing¹ raises numerous legal issues.² One of the most interesting issues relates to property rights and is illustrated by the following scenario. Suppose

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¹Hydraulic fracturing is sometimes called by various other terms, such as "fracing," "fracking," "hydrofracturing," and "hydrofracking." Hannah Jacobs Wiseman, *Fracturing Regulation Applied*, 22 Duke Envtl. L. & Policy Forum 361, 361 (2012). "Fracking" has become the shortened term most often used in the media, but "fracing" is more traditional and still is often used by persons who regularly do oil and gas law or other work in the industry. Norman J. Hyne, *NONTECHNICAL GUIDE TO PETROLEUM GEOLOGY, EXPLORATION, DRILLING*

that a company's hydraulic fracturing operations cause fracturing fluid to travel from the subsurface of one property into the subsurface of a neighboring property where the company has no authority to operate. The neighbor complains that the cross-boundary fracturing has harmed him because it is facilitating the drainage of oil or gas from the subsurface of his property, over to the company's well, but otherwise the neighbor does not allege any actual damages. In those circumstances, does the intrusion of fracturing fluid into the subsurface of the neighbor's property constitute an actionable subsurface trespass?³

AND PRODUCTION at 423-6 (2d ed. 2001) (petroleum geologist using "fracing"); Christopher S. Kulander, *Environmental Effects of Petroleum Production: 2010-2011 Texas Legislative Developments*, 44 Tex. Tech. L. Rev. 863, 86-77 (2012) (oil and gas law professor repeatedly using "fracing"); Bruce M. Kramer and Owen L. Anderson, *The Rule of Capture: An Oil and Gas Perspective*, 35 Env'tl. L. 899, 933-6 (2005) (two oil and gas law professors repeatedly using "fracing"). Because of Natural Resources Journal style guidelines, "fracking" and "hydraulic fracturing" are used in this article, rather than "fracing."

² Several of the issues relate to environmental concerns. A discussion of the various issues raised by hydraulic fracturing is beyond the scope of this article, but there are other articles that provide a broader review of the range of issues raised by fracturing. See, e.g., Keith B. Hall, *Recent Developments in Hydraulic Fracturing Regulation and Litigation*, J. Land Use & Env. Law (forthcoming); Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 Vill. Env'tl. L.J. 229 (2010); Christopher S. Kulander, *Shale Oil and Gas State Regulatory Issues and Trends*, 63 Case W. Res. L. Rev. 1101 (2013); Bruce M. Kramer, *Federal Legislative and Administrative Regulation of Hydraulic Fracturing Operations*, 44 Tex. Tech L. Rev. 837 (2012).

There are also articles that focus on specific issues raised by hydraulic fracturing. Robin Kundis Craig, *Hydraulic Fracturing (Fracking), Federalism, And The Water-Energy Nexus*, 49 Idaho L. Rev. 241 (2013); Keith B. Hall, *Hydraulic Fracturing: Trade Secrets and the Mandatory Disclosure of Fracturing Water Composition*, 49 Idaho L. Rev. 399 (2013); Keith B. Hall, *Regulation of Hydraulic Fracturing Under The Safe Drinking Water Act* 19 Buff. Env'tl. L.J. 1 (2011-2012); Hannah Jacobs Wiseman, *Trade Secrets, Disclosure, and Dissent in a Fracturing Energy Revolution*, 111 Colum. L. Rev. Sidebar (2011).

³ Others have also addressed this issue. See, e.g., David E. Pierce, *Carol Rose Comes to the Oil Patch: Modern Property Analysis Applied to Modern Reservoir Problems*, 19 Penn St. Env'tl. L. Rev. 241, 259-64 (2011); Owen L. Anderson, *Lord Coke, the Restatement, and Modern Subsurface Trespass Law*, 6 Tex. J. Oil Gas & Energy L. 203 (2010-2011); Laura H. Burney and Norman J. Hyne, *Hydraulic Fracturing: Stimulating Your Well or Trespassing?*, 44 Rocky Mtn. Min. L. Inst. Ch. 19 (1998); Terry D. Ragsdale, *Hydraulic Fracturing: the Stealthy Subsurface Trespass*, 28 Tulsa L.J. 311 (1993).

Two courts have faced this issue in recent years—the Texas Supreme Court⁴ and the United States District Court for the Northern District of West Virginia⁵—but neither court spent much time analyzing whether a trespass had occurred. The Texas Supreme Court concluded that it did not need to decide whether there had been a trespass because the rule of capture barred the recovery sought by the plaintiffs. But the rule of capture would not necessarily bar recovery if there had been trespass. In the West Virginia case, the defendant argued that, as a matter of law, a subsurface intrusion of fracturing fluid in a deep formation would not constitute a trespass. The court dismissed that argument in a conclusory manner, relying on questionable dicta regarding the extent of a landowner’s subsurface ownership and failing to analyze that dicta. Thus, the courts reached opposite results, but each court’s analysis was deficient.

This article analyzes the trespass issue that received short shrift by both the Texas Supreme Court and the federal district court. Ultimately, this article concludes that subsurface intrusions of fracturing fluid should not be classified as an actionable trespass, provided such intrusions are “near border” intrusions and that drainage of hydrocarbons is the only alleged harm. Further, a contrary result that classified such near-border intrusions as an actionable trespass would promote waste and impair correlative rights. On the other hand, a traditional trespass analysis demonstrates that an actionable subsurface trespass would occur if cross-border fractures go beyond the near-border area. Finally, this article concludes that an argument can be made for a “modern” trespass rule in which such subsurface intrusion would not constitute a trespass no matter how far the fractures went, such a rule could result in waste and harm to correlative rights unless a conservation agency closely regulates the extent of fracturing and the use of statutory pooling.

⁴ Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1 (Tex. 2008).

⁵ Stone v. Chesapeake Appalachia, LLC, 2013 WL 2097397 (N.D.W.Va. 2013).

Part I of this article explains the nature of hydraulic fracturing. Part II discusses the rule of capture, the doctrine that the Texas Supreme Court concluded would generally bar claims for subsurface intrusions by fracturing fluids. Part III examines how the law of trespass has been applied in trespass cases based on subsurface intrusions, as well as in trespass cases based on airspace intrusions, which raise some of the same issues as subsurface intrusions. Part IV reviews past hydraulic fracturing litigation. Part V analyzes how a traditional trespass analysis applies to subsurface intrusions. Parts VI and VII demonstrate why the viability of a trespass claim based on subsurface intrusions by fracturing fluid should depend on whether the intrusion is limited to “near border” areas. Finally, Part VIII analyzes proposals for a “modern” subsurface trespass model that would eliminate virtually all claims for trespass based on subsurface intrusions of fracturing fluid.

I. BASICS OF OIL AND GAS PRODUCTION AND HYDRAULIC FRACTURING

When natural deposits of oil or gas are found, the deposits typically are found in the pore spaces of sedimentary rock formations.⁶ In contrast to coal and “hard” minerals that generally are found in the solid state, oil and gas most often exist as fluids—either as a liquid or a gas.⁷ In some ways, this makes oil or gas easier to handle than solid minerals. Whereas solid minerals must be “picked up” and moved, oil or gas will flow of their own accord from a location at higher pressure to a location at lower pressure.⁸ Further, underground formations are often under a much higher pressure than exists on the surface. Thus, if a well is drilled to a formation that

⁶ Richard C. Selley, *ELEMENTS OF PETROLEUM GEOLOGY* 239 (2d ed. 1998); James G. Speight, *THE CHEMISTRY AND TECHNOLOGY OF PETROLEUM* 103 (2d ed. 1991).

⁷ Patrick H. Martin and Bruce M. Kramer, *WILLIAMS & MEYERS OIL AND GAS LAW* § 101. But oil can exist as a solid or as a liquid that is so viscous that it appears to be in the solid state. *Id.*

⁸ *Id.* § 104; *Deltic Timber Corp. v. Great Lakes Chemical Corp.*, 2 F.Supp.2d 1192, 1197 (W.D.Ark. 1998); *Northwest Central Pipeline Corp. v. State Corp. Com’n of Kansas*, 489 U.S. 493, 497, 109 S.Ct. 1262, 1267 (1989).

contains oil or gas, the natural pressure of the formation often will cause those fluids to flow to the well and up to the surface.⁹

To get to the well, the oil or gas must move through the rock formation. Often, the oil or gas can do this by moving from one pore space to the next, through interconnections between the pores.¹⁰ Or, in some rock formations, natural fractures (cracks) exist and the oil or gas can move through the fractures to the wellbore.¹¹ But in other rock formations, the interconnections between pores are not sufficient to allow a significant rate of fluid flow and there are few natural fractures.¹² If such formations contain oil or gas, it will not be economical to produce those substances through drilling alone. Instead, the operator of a well must generate fractures in the formation in order to create a pathway for oil or gas to move to the well.¹³

Operators began engaging in fracturing in the 1860s.¹⁴ They would lower an explosive into the well and detonate it, thereby fracturing the formation.¹⁵ Such “explosive fracturing,” sometimes called “shooting a well,” was used until at least the mid-1900s.¹⁶ But in the late

⁹ Patrick H. Martin and Bruce M. Kramer, WILLIAMS & MEYERS OIL AND GAS LAW § 104. Further, oil can be pumped to the surface. *Id.*

¹⁰ Martin S. Raymond & William L. Leffler, OIL AND GAS PRODUCTION IN NONTECHNICAL LANGUAGE 39 (2006).

¹¹ Christopher Kulander, *The States’ Legal Framework: Texas/Louisiana Region American Law And Jurisprudence On Fracing*, Rocky Mountain Mineral Law Foundation Special Inst. On Hydraulic Fracturing Core Issues & Trends, Paper 3A (2011) (discussing the Austin Chalk as an example of a low permeability formation that has extensive natural fracturing) (available from the Rocky Mountain Mineral Law Foundation or on Westlaw).

¹² See Daniel Yergin, THE QUEST: ENERGY, SECURITY, AND THE REMAKING OF THE MODERN WORLD 326 (2011).

¹³ *Id.*

¹⁴ See HYNE, supra note ____, at 422; see also *Roberts v. Dickey*, 20 F. Cas. 880, 883-84 (W.D. Pa. 1871) (No. 11,899) (discussing a patent granted in 1866 for an invention relating to explosive fracturing); see also *People’s Gas Co. v. Tyner*, 31 N.E. 59 (Ind. 1892) (nuisance action in which plaintiffs complained about use of explosive fracturing in urban area).

¹⁵ HYNE, supra note ____, at 422; see also Gregory Zuckerman, THE FRACKERS, 27-8 (2013).

¹⁶ HYNE, supra note ____, at 422.

1940s, hydraulic fracturing was developed.¹⁷ In hydraulic fracturing, companies use hydraulic pressure to open new fractures and increase the size of existing fractures, thereby opening pathways for oil or gas to flow to the well.¹⁸ Today, hydraulic fracturing is a process that is frequently used by companies engaged in the exploration for and production of oil and natural gas.¹⁹

II. THE RULE OF CAPTURE

In the United States, the right to explore for and produce minerals generally belongs to the owner of the land beneath which the minerals are found.²⁰ Because solid minerals remain

¹⁷ Thomas E. Kurth et al, *American Law and Jurisprudence on Fracking*, 47 *Rocky Mountain Min. L. Found. J.* 277 (2010).

¹⁸ Hyne, *supra* n. ___ at 423.

¹⁹ A Congressional Research Service report states that more than 90 percent of new wells in the United States are hydraulically fractured. Mary Tiemann and Adam Vann, *Hydraulic Fracturing and Safe Drinking Water Act Regulatory Issues*, Congressional Research Service (Jan. 10, 2013).

²⁰ *Atlantic Richfield Co. v. Tomlinson*, 859 P.2d 1088, 1094 (Okl. 1993); *California Minerals v. County of Kern*, 62 Cal. Rptr. 3d 1, 6 (Cal. Ct. App. 2007); La. Rev. Stat. 31:6. An exception to the general rule is that, in most states, ownership of mineral rights can be severed from the ownership of land. This can occur if a landowner sells the mineral rights or if the landowner sells surface rights and retains mineral rights for himself. Doing either of these things creates separate estates—a mineral estate and a surface estate. Patrick H. Martin and Bruce M. Kramer, *WILLIAMS & MEYERS OIL AND GAS LAW* § 301; *Teel v. Chesapeake Appalachia, LLC*, 906 F. Supp. 2d 519, 522 (N.D. W.Va. 2012).

This article will refer to the person who has the rights to explore for and produce minerals from a certain area of land as being the “landowner.” But in most states a person who owns land can sell his mineral rights, or sell his land and reserve the mineral rights for himself, thereby creating a “split estate” in which one person owns the “surface estate” and another person owns the “mineral estate.” Patrick H. Martin and Bruce M. Kramer, *WILLIAMS & MEYERS OIL AND GAS LAW* § 202.2. Thus, the person who owns the right to explore for and produce minerals from particular land could be the owner of a mineral estate, rather than the landowner. Louisiana law does not allow the creation of a mineral estate, but it allows the creation of a mineral servitude, which has many of the same characteristics of a mineral estate. Keith Hall, *Louisiana Oil and Gas Update*, 19 *Tex. Wesleyan L. Rev.* 361, 366-7 (2013). But the creation of a mineral estate generally establishes a permanent cleavage of surface and mineral rights, whereas a mineral servitude will terminate in the event that there is ever a ten-year period during which the servitude rights are not used. La. Rev. Stat. 31:27.

stationary until they are removed from the subsurface by human action, it generally should be fairly simple to determine who has a right to produce the solid minerals in a particular location—indeed, it should be as simple as determining who the landowner is. But different issues arise with respect to minerals such as oil and gas,²¹ which generally exist in a fluid state, and which are sometimes called “fugacious” minerals.²²

A. The Rule of Capture and its Justifications

When a well is drilled to a subsurface formation that contains oil or natural gas, those fluids generally will flow to the well from the surrounding area. If the area drained by the well extends beyond the borders of the tract of land on which the well is located, the well will produce some oil or gas that is drained from beneath neighboring land. This can lead to disputes.

For example, suppose that Black, the owner of Blackacre, drills a well near the border with Whiteacre, a tract owned by his neighbor, White. Black’s well begins producing oil at a substantial rate, with much of the oil likely being drained from beneath Whiteacre. Is Black entitled to operate the well and keep all the proceeds, or is White entitled to some type of relief—perhaps an injunction to prohibit Black from operating the well or a judgment requiring Black to share the proceeds with White?

The general rule in the United States that landowners own the mineral rights relating to their land is not the global norm. In most other countries, the national government owns the right to produce minerals. John S. Lowe, *OIL AND GAS IN A NUTSHELL* 8 (5th edition 2009).

²¹ *Test Drilling Service Co. v. Hanor Co., Inc.*, 322 F. Supp. 2d 965, 971-2 (C.D. Ill. 2004) (noting that different issues and rules apply to solid minerals as opposed to minerals that appear in fluid form); compare La. Rev. Stat. 31:5 (landowner can own solid minerals in place beneath his property) with La. Rev. Stat. 31:6 (landowner does not own minerals that are beneath his land in fluid form, and instead merely has the exclusive right to conduct operations to recover such fluids and reduce them to possession); *Callahan v. Martin*, 343 P.2d 788, 791-2 (Cal. 1935) (noting that solid mineral rights created an interest in realty, with an absolute title to the mineral rights, unlike oil and gas mineral rights, which are in the nature of a *profit a prendre*-an interest in land similar to an easement); *Tennessee Valley Kaolin Corp. v. Perry*, 526 S.W.2d 488, 491 n.1 (Tenn. Ct. App. 1975) (Tennessee law views leases for solid minerals differently than leases for oil and gas).

²² See La. Rev. Stat. 31:5 cmt. (referring to “fugacious” minerals).

Courts began facing this issue in the late 1800s. One of the leading early cases is Kelly v. Ohio Oil Co.²³ In Kelly, the plaintiff held a mineral lease that covered 165 acres in Findlay County, Ohio.²⁴ The defendant held drilling rights for tracts of land on the east and west borders of the plaintiff's leasehold,²⁵ and the defendant owned land on the south border of plaintiff's leasehold.²⁶ Beneath the land was a sandstone formation that contained oil.²⁷

The plaintiff brought suit, complaining that the defendant was drilling wells near the east, south, and west property lines. The plaintiff alleged that a well drilled to the sandstone would drain an area with a radius of about 250 feet around the well, and that the defendant had begun drilling a series of wells only 25 feet from the border of Hastings' land, so that the defendant's wells would drain a significant amount of oil from beneath Hastings' property. The plaintiff sought a permanent injunction to bar the defendant from operating wells any closer than 250 feet from Hastings' land. The lower court dismissed the plaintiff's claim, concluding that he failed to state a cause of action.

The plaintiff appealed, but the Ohio Supreme Court affirmed the dismissal of his claim. The court emphasized property rights as a basis of its decision. The court stated that "[t]he right to drill and produce oil on one's own land is absolute, and cannot be supervised or controlled by a court or an adjoining landowner."²⁸ The court found it "intolerable that the owner of real property, before making improvements on his own lands, should be compelled to submit to what his neighbor or a court of equity might regard as a reasonable use of his property." The court also noted that it is impossible to know what fraction of the produced oil came from beneath each

²³ 49 N.E. 399 (Ohio 1897).

²⁴ *Id.* at 399.

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Id.* at 401.

tract. Therefore, “whatever gets into the well belongs to the owner of the well, no matter where it came from.” Finally, the court stated that “an ample and sufficient remedy” is for the neighbor to drill his own wells, and that he is not entitled to either an injunctive relief or an accounting.

Another early case was Barnard v. Monongahela Natural Gas Co.²⁹ In Barnard, the defendant leased a tract of land. A corner of the tract protruded into the plaintiffs’ tract of land. The defendant drilled a well near the corner and began producing natural gas.³⁰ The plaintiffs brought suit, complaining that much of the natural gas was being drained from beneath their property. The court concluded that the typical gas well in that area would drain a ten-acre circle that surrounded the well. Further, if a ten-acre circle were drawn around the defendant’s well, slightly more than three-fourths of the area within the circle would be the plaintiffs’ land. Thus, a plausible estimate was that 75-percent of the gas produced from the defendant’s well came from beneath the plaintiffs’ land.

The lower court dismissed the plaintiff’s case, however, basing its decision in part on the right of a landowner to drill a well wherever he chooses on his property.³¹ The court also noted that “[t]here is no certain way of ascertaining how much of the oil and gas that comes out of the well” was originally beneath the property on which a well is located and how much was beneath the neighboring property.³² Accordingly, explained the court, if a landowner believes that his property is being drained, his only remedy is to drill his own well.³³ Instead of seeking to stop his

²⁹ 65 A. 801 (Pa. 1907).

³⁰ *Id.* at 801.

³¹ *Id.*

³² *Id.*

³³ *Id.*

neighbor's drilling, he should "go and do likewise."³⁴ The Pennsylvania Supreme Court's per curiam decision affirmed and quoted in full the lower court's decision.³⁵

This result became known as the "rule of capture," or sometimes the "law of capture,"³⁶ and appears to have been adopted by all states that have addressed the issue in the oil and gas context.³⁷

B. Limitations on the Rule of Capture

There are certain limitations on application of the rule of capture. Three of the most significant limitations, each of which also is relevant to the subject of this article, are that the rule of capture does not apply if: (1) a person commits a subsurface trespass by engaging in slant drilling that results in the well bottoming beneath his neighbor's property; (2) a person negligently or intentionally wastes oil or gas or he intentionally interferes with the ability of someone else to produce oil or gas from a formation, without benefit to himself; or (3) the rule has been superseded by conservation statutes and regulations.³⁸

³⁴ *Id.*

³⁵ *Id.*

³⁶ Terence Daintith, *FINDERS KEEPERS? HOW THE LAW OF CAPTURE SHAPED THE WORLD OIL INDUSTRY* (RFF Press 2010); Bruce M. Kramer and Owen L. Anderson, *The Rule of Capture: An Oil and Gas Perspective*, 35 *Env'tl. L.* 899, 933-6 (2005).

³⁷ See, e.g., *Gadeco, LLC v. Industrial Com'n of State*, 812 N.W.2d 405, 407 (N.D. 2012); *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 13 (Tex. 2008); *Bonner v. Oklahoma Rock Corp.*, 863 P.2d 1176, 1185 (Okla. 1993); *Desormeaux v. Inexco Oil Co.*, 277 So.2d 218, 220 (La. Ct. App. 1973).

Other sources provide excellent, more comprehensive treatment of the rule of capture. See, e.g., Bruce M. Kramer and Owen L. Anderson, *The Rule of Capture – An Oil and Gas Perspective*, 35 *Env'tl. L.* 899 (2005); Terence Daintith, *Finders Keepers? How the Law of Capture Shaped the World Oil Industry* (RFF Press 2010).

³⁸ Another limitation that is not at issue here is the rule of capture may not apply when a company places natural gas into subsurface storage and that gas escapes and is later produced from a well operated by a neighbor. *Northern Natural Gas Co. v. ONEOK Field Services Co.*, 296 P.3d 1106 (Kan. 2013).

The two latter types of limitation have been justified by the doctrine of “correlative rights.” This doctrine recognizes that when multiple tracts of land overlie a common reservoir of oil or gas, the owners of those separate tracts each have a right to produce oil or gas from the reservoir, through operations on their own properties, but that each owner’s exercise of his rights can affect the common reservoir and thereby affect the ability of the other owners’ to produce oil or gas from the reservoir.³⁹ Accordingly, each owner has certain duties that relate to the reservoir, and the other owners have rights that arise from that duty.⁴⁰

1. Surface Trespass and Subsurface Trespass by Slant Drilling

A landowner generally has the exclusive right to explore for and produce minerals from operations on his own land.⁴¹ Further, the rule of capture provides that the landowner becomes the owner of all the oil and gas produced from operations on his own land, and that he incurs no liability to his neighbor, even if some of the oil or gas that is drained from beneath the neighbor’s land.⁴² Thus, the rule of capture does not authorize a person to enter the surface of another person’s land to conduct oil and gas operations.⁴³ If a landowner conducts operations on his

³⁹ Eugene Kuntz, *Correlative Rights in Oil and Gas*, 30 Miss. L.J. 1, 2 (1958); *Halbouty v. Railroad Commission*, 357 S.W.2d 364, 374 (Tex. 1962) (“It is an obvious result that if in a common reservoir one tract owner is allowed to produce many times more gas than underlies his tract he is denying to some other landowner in the reservoir a fair chance to produce the gas underlying his land.”).

⁴⁰ *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558, 562-3 (Tex. 1948); *Higgins Oil & Fuel Co., Inc. v. Guaranty Oil Co.*, 82 So. 206, 212 (La. 1919) (“The rights of the several owners of the gas field are coequal; one owner cannot exercise his own right so as to preclude his neighbor from exercising his, or so as to interfere with the neighbor.”). Professor David Pierce has argued that the question of whether a subsurface intrusion of fracturing fluids constitutes an actionable trespass should be resolved using a correlative rights analysis. David E. Pierce, *Minimizing the Impact of Oil and Gas Development by Maximizing Production Conservation*, 85 N.D. L. Rev. 759, 771 (2009).

⁴¹ See, e.g., La. Rev. Stat. 31:6.

⁴² See, e.g., La. Rev. Stats. 31:8, 14.

⁴³ *Kelly v. Ohio Oil Co.*, 49 N.E. 399, 401 (Ohio 1897) (early rule of capture case stating: “To drill an oil well near the line of one’s land cannot interfere with the legal rights of the owner of

neighbor's property without permission, those operations generally will constitute a trespass, and the trespasser typically will be required to reimburse the neighbor for the value of the oil or gas produced.⁴⁴ Depending on circumstances and the jurisdiction, the trespasser may or may not be able to deduct his drilling expenses from the reimbursement amount.⁴⁵

A similar result follows for a subsurface intrusion by "slant" drilling. Slant drilling occurs when the wellbore of a "vertical" well does not go straight downward. Sometimes an operator deliberately engages in slant drilling, which might be called "directional" drilling when it is done intentionally, and sometimes the operator's direction of drilling will deviate from true vertical inadvertently.⁴⁶ Courts have recognized that the operator of a well commits a subsurface trespass if he begins drilling a well at a surface location where he has the right to operate, but the wellbore veers from true vertical to such an extent that the wellbore intrudes into the subsurface of a neighboring property where the operator has no right to drill.⁴⁷ In such cases, the measure of damages may be the value of the oil or gas produced by the trespassing wellbore.⁴⁸

the adjoining lands so long as all operations are confined to the lands upon which the well is drilled.")

⁴⁴ See, e.g., La. Civ. Code art. 488. When a company trespasses and drills without authority to operate at the surface location, the company generally does not knowingly trespass. John S. Lowe, et al. *Cases and Materials on Oil and Gas Law* 144 (West, 6th Edition, 2013). Instead, the operator generally has operated pursuant to a lease obtained from a person without good title or has operated pursuant to an otherwise valid lease that has terminated (it is not always clear whether a lease has terminated because, although mineral leases generally have a primary term that is a stated number of years, virtually all modern leases have habendum clauses and other clauses that can lead to a later termination, and many have delay rental clauses or other provisions that can lead to earlier terminations).

⁴⁵ See, e.g., La. Civ. Code art. 488.

⁴⁶ Hyne, *supra* n. ___ at 285.

⁴⁷ *Williams v. Continental Oil Co.*, 14 F.R.D. 58 (W.D. Okla. 1953); *Hastings Oil Co. v. Texas Co.*, 234 S.W.2d 389 (Tex. 1950); *Gliptis v. Fifteen Oil Co.*, 16 So. 2d 471 (La. 1944); *Alphonzo E. Bell Corporation v. Bell View Oil Syndicate*, 76 P.2d 167 (Cal. App. 1938).

⁴⁸ The Manual of Oil & Gas Terms defines "subsurface trespass" as follows:

The bottoming of a well on the land of another without his consent. Subsurface trespass results from the drilling of a "slant" or DIRECTIONAL WELL (q.v.),

2. Negligent or Intentional Waste or Deliberate Interference with the Production Rights of Others

Courts have used the correlative rights doctrine to justify certain jurisprudential limits on the rule of capture. Two examples of such limits are found in decisions recognizing that the rule of capture does not protect a defendant from liability for negligent or intentional waste of oil or gas in a reservoir,⁴⁹ and that the rule of capture does not protect a person from liability for acts that are of no benefit to himself, and which are done with the intent of interfering with someone else's ability to exercise his rights to produce from the common pool.

The non-application of the rule of capture in cases of negligent or intentional waste of resources is illustrated by Elliff v. Texon Drilling Co.⁵⁰ In that case, the defendants were drilling a gas well that blew out, caught fire, and burned for several years.⁵¹ The land around the well cratered, and the cratering eventually extended to the plaintiffs' property, damaging it.⁵² The plaintiffs brought suit, alleging that the blowout resulted from the defendants' negligence.⁵³ The plaintiffs sought a money judgment for the damages to their property and for the natural gas that had been drained from beneath their property because of the blowout.⁵⁴

[Why is this in caps? Even if that punctuation appeared in the original, we should use lower case unless there is a compelling reason to use caps] which may be intentional or unintentional. Since subsurface trespass is as wrongful as surface trespass, the same liability attaches, viz., damages in the amount of the value of the oil produced. Whether the trespasser is entitled to a credit for the cost of producing the oil depends on whether his trespass was made in good faith or bad faith, as it does in the case of surface trespass.

Patrick H. Martin and Bruce M. Kramer, *MANUAL OF OIL & GAS TERMS*.

⁴⁹ La. Rev. Stat. 31:14; Eugene Kuntz, *Correlative Rights in Oil and Gas*, 30 Miss. L.J. 1, 2 (1958).

⁵⁰ 210 S.W.2d 558 (Tex. 1948).

⁵¹ *Id.* at 559.

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

The defendants argued that the rule of capture prevented the plaintiffs from recovering the value of oil or gas drained from beneath their property by the defendants' well. The Texas Supreme Court held that "under the law of capture there is no liability for reasonable and legitimate drainage from the common pool."⁵⁵ But the court also stated that drainage which results from the negligent waste of gas is not legitimate drainage, and that the rule of capture should not deny the plaintiffs a remedy for the losses they sustained because of such waste.⁵⁶

The non-application of the rule of capture in cases in which a defendant intentionally interferes with another person's ability to produce oil or gas from the common reservoir is illustrated by Higgins Oil & Fuel Co., Inc. v. Guaranty Oil Co.⁵⁷ In that case, the plaintiff drilled a well and began producing oil from a reservoir from which other persons in the area were also producing oil. The defendant was the plaintiff's neighbor. The defendant also drilled a well to the reservoir. For some reason, the defendant's well was not productive. But his well seemed to be physically linked to the common reservoir. Indeed, the plaintiff alleged that the opening to the surface provided by the defendant's well was diminishing the rate of production from the plaintiff's well. And, though the defendant's well was not productive, the defendant refused to close or plug it, instead preferring to leave it open with the intent and purpose of decreasing the plaintiff's ability to produce oil.

The Louisiana Supreme Court held that the defendant must plug his well. The court suggested that the defendant would not have been obligated to take affirmative action to benefit the plaintiff if the plaintiff's inability to produce oil was merely the result of "inaction" by the defendant. But here the defendant had created the opening that was interfering with the

⁵⁵ *Id.* at 562.

⁵⁶ *Id.* at 563.

⁵⁷ 82 So. 206 (La. 1919).

plaintiff's ability to produce oil from the common reservoir. Further, the court suggested that the defendant would not be obligated to plug his well if he obtained some benefit from leaving it open. But the defendant could not leave the well open merely for the purpose of diminishing the plaintiff's ability to produce oil.

3. Conservation Statutes and Regulations

In addition to serving as a justification for the above-noted judicial limitations on the rule of capture, the correlative rights doctrine also is one of the justifications for legislative and regulatory measures⁵⁸ that limit the rule of capture in an effort to address certain problems that it can cause.

There are three notable problems that can arise from the rule of capture. First, because the rule gives a landowner an incentive to produce oil or gas as quickly as possible, in order to produce those substances before his neighbor does, the rule can prompt persons to drill more wells than are necessary to efficiently drain the oil or gas in an area.⁵⁹ Because drilling wells is expensive, excess drilling is a form of economic waste. Second, because it is impossible to recover one hundred percent of the oil in a reservoir, some oil always is left in place underground, but too rapid a rate of production can lead to lower overall recovery and a greater amount of oil left underground than if the individuals in an area were operating at a more moderate pace.⁶⁰ The lower recovery is a form of physical waste. Third, some persons might

⁵⁸ Conservation statutes and regulations include such provisions as well-spacing rules, restrictions on venting and flaring, limitations on allowable production rates, prorationing, and forced pooling.

⁵⁹ *Gadeco, LLC v. Industrial Com'n of State*, 812 N.W.2d 405, 407 (N.D. 2012); *Nunez v. Wainoco Oil & Gas Co.*, 488 So.2d 955, 960 (La. 1986) (rule of capture encouraged indiscriminate drilling).

⁶⁰ *Nunez*, 488 So.2d at 960 (referring to possible waste of reservoir energy and diminished ultimate recovery).

conclude that it is unfair to divide the proceeds of production in an area based simply on who produces the oil or gas first.⁶¹

Starting in the early 1900s, states began to address these problems with conservation statutes and regulations.⁶² Three of the most common methods are well spacing rules, setback rules, and forced pooling or unitization. Well spacing rules require that the distance between wells be at least a minimum distance that is set by statute or regulation. Setback rules require that wells generally be located no closer than a specified distance from property lines. “Forced pooling” or “unitization” gives regulators the authority to enter an order that designates a specified area as a “unit.”⁶³ Typically, the size of a unit will be the maximum area that can be efficiently drained by one well. Regulators generally will allow only one well to be drilled within the unit,⁶⁴ and they specify that all persons owning mineral rights within the unit will share in the proceeds from that well.

Such conservation rules were challenged as being unconstitutional taking of a person’s property rights without compensation.⁶⁵ And indeed conservation rules do restrict a person’s exercise of his property rights. For example, if he owns land in a forced pool or unit, but some

⁶¹ Cf. *Nunez*, 488 So.2d at 960 (noting that one goal of conservation regulation can be “to insure [Question: did the case really use “insure”? Or did it use “ensure”?] [Yes, it used “insure.” KBH] a fair and reasonable participation, by the surface owners in the common pool within the producing area”).

⁶² *Nunez v. Wainoco Oil & Gas Co.*, 488 So.2d 955, 960 (La. 1986) (discussing Louisiana conservation statutes enacted in early 1900s).

⁶³ See, e.g., La. Rev. Stats. 31:9 and 31:10. “Pooling” and “unitization” often are used interchangeably, though some people use the two words to describe analogous, but distinguishable, types of conservation orders. This article will use the two words interchangeably.

⁶⁴ A particular unit generally applies only for a specific formation. See, e.g., *EOG Resources, Inc. v. Chesapeake Energy Corp.*, 605 F.3d 260, 262-63 (5th Cir. 2010) (referring to units that applied to particular formations beneath the same area of land). Thus, if there are multiple productive formations in an area, each at different depths, there may be multiple units that cover the same area, though each will apply as to different depths beneath the surface.

⁶⁵ *Hunter Co. Inc. v. McHugh*, 11 So. 2d 495 (La. 1943); *Patterson v. Stanolind Oil & Gas Co.*, 77 P.2d 83 (Okla. 1938); *Ohio Oil Co. v. Indiana*, 177 U.S. 190, 20 S.Ct. 576 (1900).

other person has received a permit to drill the single well that will be allowed within the unit, the first individual may be barred from drilling on his property. Or, if a person has drilled a unit well, but he owns only some of the property in the unit, he will be forced to share the proceeds of his well's production with the other persons who own property in the unit. But courts upheld such conservation rules against constitutional challenges.⁶⁶ In rejecting the constitutional challenges, the courts relied in part on the correlative rights doctrine. The courts noted that each person who owns rights in a common pool of oil or gas has a right to produce from the common pool, but each person's exercise of his right will affect the ability of other persons to exercise their rights.⁶⁷ This, along with the general police power, justifies conservation regulations that are designed to avoid waste—both physical and economic—and protect each person's right to produce his fair share of oil or gas from the common reservoir.⁶⁸

III. TRESPASS AND THE AD COELUM DOCTRINE

The extent to which a person has a claim for an alleged subsurface trespass requires consideration of the nature of trespass claims, as well as the ad coelum doctrine, which concerns a landowner's rights relating to the airspace above his land and the subsurface below it.

A. Trespass

⁶⁶ Hunter Co. Inc. v. McHugh, 11 So. 2d 495 (La. 1943); Patterson v. Stanolind Oil & Gas Co., 77 P.2d 83 (Okla. 1938); Ohio Oil Co. v. Indiana, 177 U.S. 190, 20 S.Ct. 576 (1900).

⁶⁷ Hunter Co. Inc. v. McHugh, 11 So. 2d 495 (La. 1943); Patterson v. Stanolind Oil & Gas Co., 77 P.2d 83 (Okla. 1938); Ohio Oil Co. v. Indiana, 177 U.S. 190, 20 S.Ct. 576 (1900).

⁶⁸ Hunter Co. Inc. v. McHugh, 11 So. 2d 495 (La. 1943); Patterson v. Stanolind Oil & Gas Co., 77 P.2d 83 (Okla. 1938); Ohio Oil Co. v. Indiana, 177 U.S. 190, 20 S.Ct. 576 (1900).

The concept also serves as a basis for a claim that a rule or regulatory order that prevented a landowner from developing his resources altogether is a taking of private property. Eugene Kuntz, Correlative Rights in Oil and Gas, 30 Miss. L.J. 1, 7 (1958) (citing Railroad Commission v. Magnolia Petroleum Co., 169 S.W.2d 253 (Tex. Civ. App. 1943)).

A trespass is an intrusion onto land in violation of a plaintiff's exclusive right of possession.⁶⁹ A plaintiff must have the right of possession in order to bring a claim in trespass.⁷⁰ Typically, a landowner has the right to possess his own land and therefore he will have the right to bring a trespass action if someone intrudes without permission.⁷¹ If the owner does not possess the land, but no one else has established possession, the landowner has constructive possession and therefore could bring an action in trespass against an intruder.⁷²

Although "trespass" often is described as an intrusion onto land, the law recognizes that a trespass also can occur by intrusion into the airspace over land or the subsurface below land.⁷³ This is appropriate for a number of reasons. First, for surface possession and ownership to have any utility, a landowner typically must have ownership rights and control with respect to some distance above and below the surface of the land. For example, if a landowner is going to build any structure on his land, the structure will likely project into the airspace above the ground.

⁶⁹ Team Enterprises, LLC v. Western Investment Real Estate Trust, 647 F.3d 901, 912 (9th Cir. 2011) (under California law, a trespass is "an invasion of the interest in the exclusive possession of land."); Minch Family LLLP v. Buffalo-Red River Watershed Dist., 628 F.3d 960, 968 (8th Cir. 2010) (Minnesota law); W. Page Keeton, et al., PROSSER AND KEETON ON TORTS at Ch. 3, § 13 (p. 77) (5th ed. 1984).

⁷⁰ Florig v. Estate of O'Hara, 912 A.2d 318, 327 n.13 (Pa. Super. Ct. 2006); *see also* W. Page Keeton, et al., PROSSER AND KEETON ON TORTS at Ch. 3, § 13 (p. 77) (5th ed. 1984).

⁷¹ Babb v. Lee County Landfill SC, LLC, 747 S.E.2d 468, 473 (S.C. 2013); Johnson v. Paynesville Farmers Union Co-op. Oil Co., 817 N.W.2d 693, 700-1 (Minn. 2012). If the land is under lease, the lessee might be the person who has the right to bring a trespass action. Bascom v. Dempsey, 9 N.E. 744, 744-5 (Mass. 1887) (lessor who was not in possession could not bring trespass action); Ikomoni v. Executive Asset Mgmt., LLC, 709 S.E.2d 282, 286 (Ga. Ct. App. 2011); Sumrall v. City of East St. Louis, 2013 WL 141694 *2 (S.D. Ill. 2013) (lessee can bring trespass action). If someone has established wrongful possession, the landowner may not have a claim in trespass, but if his ownership has not been lost by adverse possession he may have the right to bring an ejectment action or a petitory action to force the possessor to leave. W. Page Keeton, et al., PROSSER AND KEETON ON TORTS at Ch. 3, § 13 (p. 77) (5th ed. 1984); La. Code Civ. Proc. art. 3651.

⁷² W. Page Keeton, et al., PROSSER AND KEETON ON TORTS at Ch. 3, § 13 (p. 77) (5th ed. 1984).

⁷³ Restatement (Second) of Torts § 159; Hannabalsen v. Sessions, 90 N.W. 93 (Iowa 1902) (airspace); Hastings Oil Co. v. Texas Co., 234 S.W.2d 389 (Tex. 1950) (subsurface).

Further, a foundation may need to project into the subsurface, and it often is useful or necessary to have utility lines, basements, and water wells constructed into the subsurface.

Second, recognizing such intrusions as trespasses is consistent with the notion that trespass actions are designed to vindicate a person's possessory interest. If a person is in actual possession of the surface of land, he necessarily will be using and occupying at least some minimum amount of airspace above and subsurface below the surface. For example, if a person exercises possession of land by using it and constructing a house on it, that person is using and occupying the airspace to an elevation at least as tall as the house, and his actual possession probably should be deemed to include some reasonable distance above the highest elevation that he is using.

A similar argument can be made with respect to the subsurface. And even if the owner⁷⁴ has not built structures that project below the surface, or any structures whatsoever, he needs some minimum amount of ground beneath the surface to support his own weight. If someone tunneled beneath the owner's subsurface to within an inch of the ground, the surface would collapse. Thus, a person's possessory interest would not be secure and might be vulnerable to undue interference if his possession was deemed to end immediately above and below the space he is actually using. Finally, noise or other effects of airspace or subsurface intrusions might interfere with the landowner's use and enjoyment of his land, even if it did not directly and physically interfere.

⁷⁴ Although the right to bring a trespass claim is based on possession, not ownership, this article sometimes will refer to the "owner" or "landowner" as the person who has or might have a trespass claim.

The principle that intrusions into the airspace above land or the subsurface below land has been recognized in numerous cases, as illustrated by cases discussed below in Section III(B)_____ of this article.

B. The Ad Coelum Doctrine and its Application in Trespass Cases

Few landowners exercise actual possession of the regions far above or below the surface. But a landowner might have constructive possession of such regions, and thus have a remedy against intrusions into the airspace above or the subsurface below his land, assuming that he owns those regions.

Further, a literal interpretation of a traditional maxim of the common law suggests that a landowner does own such regions. Prominent common law commentators and numerous American courts have expressed a maxim known as the ad coelum doctrine, which seems to provide that the owner of land owns not just the surface, but the entire airspace above it and the entire subsurface below it.⁷⁵ This doctrine's name comes from the Latin phrase "cujus est solum ejus est usque ad coelum et ad inferos," which has been translated as "for whoever owns the soil, it is theirs up to Heaven and down to Hell."⁷⁶

On numerous occasions, courts have held that liability for trespass can be based on airspace or subsurface intrusions. For example, courts have held that a landowner has an action in trespass when some portion of a neighboring building or other construction intrudes into his airspace.⁷⁷ Such intrusions have included eaves,⁷⁸ cornices,⁷⁹ and roofs⁸⁰ that project over a

⁷⁵ Thrasher v. City of Atlanta, 173 S.E. 817, 825 (Ga. 1934).

⁷⁶ Alyce Gaines Johnson Special Trust v. El Paso E & P Co., L.P., 773 F.Supp.2d 640, 645 (W.D. La. 2011).

⁷⁷ See, e.g., Murphy v. Bolger, 15 A. 365 (Vt. 1888).

⁷⁸ Huber v. Stark, 102 N.W. 12 (Wis. 1905), cf. Aiken v. Benedict, 39 Barb.(N.Y.) 400 (N.Y. 1863) (ejectment action).

⁷⁹ Harrington v. McCarthy, 48 N.E. 278 (Mass. 1897).

plaintiff's property. Courts have held that wires passing over a plaintiff's property can constitute a trespass,⁸¹ and one court held that a defendant committed a trespass when she extended her arm over the property line.⁸² Courts also have recognized that a person commits a trespass when he drills a slant well that bottoms below the plaintiff's land.⁸³

Notably, the airspace intrusions all occurred relatively near the surface—at elevations that the plaintiff was actually using, at elevations close to those the plaintiff was using, or at elevations that the plaintiff reasonably could be expected to use. And the subsurface intrusions by slant drilling occurred at depths where the plaintiff reasonably could have been expected to perform his own oil and gas exploration. What about intrusions at greater elevations or far beneath the surface? This raises the question of whether a landowner's ownership really does extend all the way to the center of the earth and all the way to the heavens (with "heavens" presumably meaning outer space).

C. Limitations on the Ad Coelum Doctrine

If the ad coelum doctrine were applied literally, a landowner might have a viable trespass claim for intrusions at high altitudes, far above those he was using or reasonably could be expected to use in connection with his land. He might also have claims for trespass in the event of a subsurface intrusion, even if the intrusion occurred at a depth he was not using and could not reasonably be expected to use.

⁸⁰ *Murphy v. Bolger*, 15 A. 365 (Vt. 1888).

⁸¹ *Marcus Cable Associates, L.P. v. Krohn*, 90 S.W.3d 697 (Tex. 2002); *Butler v. Frontier Telephone Co.*, 79 N.E. 716 (N.Y. 1906).

⁸² *Hannabalsen v. Sessions*, 90 N.W. 93 (Iowa 1902).

⁸³ *Williams v. Continental Oil Co.*, 14 F.R.D. 58 (W.D. Okla. 1953); *Hastings Oil Co. v. Texas Co.*, 234 S.W.2d 389 (Tex. 1950); *Gliptis v. Fifteen Oil Co.*, 16 So. 2d 471 (La. 1944); *Alphonzo E. Bell Corporation v. Bell View Oil Syndicate*, 76 P.2d 167 (Cal. App. 1938).

But a clear modern trend in both legal commentary and court decisions is that the ad coelum doctrine does not apply literally and that landowners' right to bring trespass claims for high-elevation airspace intrusions or deep subsurface intrusions is limited. The cases demonstrate that a landowner's rights are limited to the portions of airspace and subsurface that are relatively near the surface of the land, and that he does not have a trespass claim absent intrusions into those areas. Even then that the landowner might not have a claim for airspace or subsurface intrusions absent actual harm or substantial interference with the landowner's reasonably foreseeable use and enjoyment of either the land itself or the airspace or the subsurface above and below it.

1. Air travel limitations to the ad coelum doctrine

It is well-established that a landowner has no cause of action in trespass against persons who engage in high-altitude air travel over his property. In Thrasher v. City of Atlanta, the plaintiff brought a claim for trespass based on aircraft flying over his land.⁸⁴ At that time, Georgia's Civil Code declared that "the right of the owner of lands extends downward and upward indefinitely."⁸⁵ Further, the Code stated that "the owner of realty having title downwards and upwards indefinitely, an unlawful interference with his rights, below or above the surface, alike gives him a right of action."⁸⁶ The Georgia Supreme noted the importance of air travel to society,⁸⁷ but ultimately based its decision on a property rights analysis.

The court concluded that the relevant provisions of Georgia's Civil Code were based on the common law's ad coelum doctrine and therefore should be interpreted as including any

⁸⁴ 173 S.E. 817, 825 (Ga. 1934).

⁸⁵ *Id.* (citing Ga. Civ. Code (1910) § 3617).

⁸⁶ *Id.* (citing Ga. Civ. Code (1910) § 4477).

⁸⁷ *Id.* at 819.

limitations existing within that doctrine.⁸⁸ The court analyzed the doctrine and concluded that the full, literal expression of the doctrine is mere dicta. The court explained that, “The common-law cases from which the ad coelum doctrine emanated were limited to facts and conditions close to earth and did not require an adjudication on the title to the mansions in the sky.”⁸⁹ Therefore, the pronouncements from such cases were mere dicta with respect to higher altitudes.⁹⁰

The Georgia Supreme Court stated that “[p]ossession is the basis of all ownership” and that title to land therefore “can hardly extend above an altitude representing the reasonable possibility of man’s occupation and domain.”⁹¹ The court reasoned that a landowner could claim possession to the height of any building, and perhaps the landowner could be deemed to hold actual possession of the space immediately above the “trees, buildings, and structures affixed to the soil.”⁹² Further, if a neighbor constructed a tall building with an overhang projecting over the landowner’s property, that construction would demonstrate that the space was subject to actual possession and therefore the overhang might be the basis for a trespass action.⁹³

But flying through the airspace at high altitude is not an act of possession.⁹⁴ Therefore, air travel at low altitude across a person’s property might constitute a trespass,⁹⁵ and the

⁸⁸ *Id.* at 825 (“These provisions of the Code should therefore be construed in the light of the authoritative content of the maxim itself.”).

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ 173 S.E. at 825.

⁹² *Id.* at 826.

⁹³ *Id.* at 825.

⁹⁴ *Id.* at 825-6.

⁹⁵ *Id.* at 826.

operation of aircraft at higher altitudes that actually interferes with a landowner's use of the land might constitute a nuisance,⁹⁶ but air travel at higher altitudes would not constitute a trespass.⁹⁷

In other cases in which landowners have complained about aircraft flying over their property, courts similarly have concluded that the ad coelum doctrine is dicta to the extent that it suggests title to land extends to indefinite altitudes. Accordingly, landowners may be entitled to relief if low-altitude flights over their lands cause actual harm or inconvenience, but they are not entitled to relief for high altitude flyovers that do not cause harm or inconvenience.⁹⁸ A particularly notable decision is the 1946 United States Supreme Court opinion in United States v. Causby.⁹⁹

In Causby, a plaintiff who lived near an airfield brought suit, asserting that low-level flights had effected a "taking" of his property and that he was entitled to compensation. The Court ruled that, under the facts shown, the plaintiff could assert a takings claim because the flights seriously impaired the plaintiff's use and enjoyment of his property,¹⁰⁰ which extends upward from the surface to encompass "at least as much of the space above the ground as he can

⁹⁶ *Id.* at 825 (landowner "may complain of any [flights] tending to diminish the free enjoyment of the soil," though the air travel might be at altitudes above the altitude subject to possession); *id.* at 826 ("it could be a nuisance" if the air travel causes harm or inconvenience).

⁹⁷ The decision is based on a conclusion that ownership does not extend indefinitely upward. If a court concluded that ownership extended indefinitely upward, but that constructive possession did not, such reasoning might also bar a trespass claim, given that a landowner would not have actual possession of high elevations and that a person must have actual or constructive possession in order to bring a trespass claim. But if ownership extended indefinitely upward, a landowner might be able to bring a claim based on some other theory, such as ejectment.

⁹⁸ *Smith v. New England Aircraft Co.*, 170 N.E. 385, 393 (Mass. 1930) (noting altitude of "possible effective possession" as potential limit on trespass claims); *Swetland v. Curtiss Airports Corp.*, 41 F.2d 929, 938 (N.D. Ohio 1930) (noting that decisions suggesting title to land extended to indefinite heights did not involve disputes over alleged trespasses at altitudes generally used in air travel); *Rochester Gas & Elec. Corp.*, 266 N.Y.S. 469, 471 (N.Y. Ct. App. 1933) ("[I]t may be confidently stated that, if [the ad coelum] maxim ever meant that the owner of land owned the space above the land to an indefinite height, it is no longer the law.").

⁹⁹ *United States v. Causby*, 328 U.S. 256, 66 S. Ct. 1062 (1946).

¹⁰⁰ 328 U.S. at 266-7, 66 S. Ct. at 1068.

occupy or use in connection with the land.”¹⁰¹ But the Court also suggested a landowner would not have grounds to complain about the mere fact that aircraft fly over his property at high altitudes. The Court explained that the “[ad coelum] doctrine has no place in the modern world,” and the “public interest” requires that the air be a “public highway.”¹⁰²

The Restatement (Second) of Torts reaches a similar result. Section 159 establishes a general rule that trespasses may occur “above the surface of the earth,” but the Section also states that an aircraft’s flight over land will not constitute a trespass unless the aircraft “enters into the immediate reaches of the air space next to the land, and ... it substantially interferes with the other’s use and enjoyment of his land.”¹⁰³

2. Injection disposal exceptions to the ad coelum doctrine

Many liquid wastes are discarded in injection disposal wells.¹⁰⁴ The process is the opposite of what happens in the production of oil from an oil well or water from a water well.

¹⁰¹ 328 U.S. at 264, 66 S. Ct. at 1067.

¹⁰² 328 U.S. at 261, 66 S. Ct. at 1065. *See also* 328 U.S. at 266, 66 S. Ct. at 1068 (“The airspace, apart from the immediate reaches above the land, is part of the public domain.”). The Ohio Supreme Court applied the reasoning that the *ad coelum* doctrine does not apply in its full literal expression in support of its holding that a plaintiff did not have a takings claim based on a zoning law that limited heights of buildings near an airport. *Village of Willoughby Hills v. Corrigan*, 278 N.E.2d 658, 664 (Ohio 1972) (“It is now well settled that the doctrine of the common law, that the ownership of land extends to the periphery of the universe, has no place in the modern world.”). Such reasoning goes further than the decisions that hold that a landowner’s ownership does not extend beyond the height he can reasonably possess, but is consistent with the proposition that the ad coelum doctrine is not applied literally.

¹⁰³ The Restatement (First) Torts is similar. Section 159 states that a trespass can occur “above the surface of the earth,” but Section 194 provides that air travel over land will not constitute a trespass if the travel complies with applicable regulation and it has a legitimate purpose, is conducted in a reasonable manner, and occurs “at such a height as not to interfere unreasonably with the possessor’s enjoyment of the surface of the earth and the air space above it.”

¹⁰⁴ See EPA webpage, “Basic Information about Injection Wells,” available at http://water.epa.gov/type/groundwater/uic/basicinformation.cfm#what_is. Section C of the Safe Drinking Water Act governs underground injections. 42 U.S.C. § 300h(a)-(b). More than 650,000 injection wells have been granted permits to operate under the Safe Drinking Water Act.

The liquid waste is pumped down a well that has been drilled to a permeable formation. The waste exits the well and migrates into the formation. Over time, as more and more waste liquid is injected into the disposal well, the waste fluid can migrate across subsurface property lines.

In a handful of cases, plaintiffs have filed lawsuits, alleging that a neighbor's operation of an injection disposal well has resulted in a subsurface trespass of waste fluids. The trend in such suits is for courts to hold that a plaintiff cannot maintain a subsurface trespass action merely based on the migration of waste fluids into the subsurface of his property. Instead, a plaintiff must be able to show actual damages or an interference with some reasonably anticipated use of his property in order to sustain a trespass action.¹⁰⁵

For example, in Chance v. BP Chemicals, Inc., the plaintiffs brought a class action, asserting trespass claims that were based on allegations that fluids from the defendant's injection disposal well had intruded into the subsurface of the plaintiffs' properties.¹⁰⁶ After a jury returned a verdict finding that the plaintiffs had not proven actual damages or an unreasonable interference with a foreseeable use of their properties, the trial court entered judgment for the defendant.¹⁰⁷ The appellate court affirmed and the Ohio Supreme Court agreed to review the case.

The plaintiffs argued that proof of a subsurface intrusion is sufficient to prove a trespass and that once a trespass is proven damages could be presumed.¹⁰⁸ The Ohio Supreme Court disagreed. The court declared that the ad coelum doctrine "has no place in the modern world."¹⁰⁹

See EPA webpage, "UIC Inventory by State – 2011," available at <http://water.epa.gov/type/groundwater/uic/upload/uicinventorystate2011.pdf>.

¹⁰⁵ See, e.g., West Edmond Salt Water Disposal Assn. v. Rosecrans, 226 P.2d 965 (Okla. 1950).

¹⁰⁶ 670 N.E.2d 985, 986 (Ohio 1996).

¹⁰⁷ *Id.* at 989.

¹⁰⁸ *Id.* at 993.

¹⁰⁹ *Id.* at 991 (citing Winston v. Cornish, 5 Ohio 477, 478 (1832)).

The court then quoted with approval a case in which the Ninth Circuit stated that a person's ownership of the airspace above his land extends only so far as the space he can use and occupy.¹¹⁰ The Ohio Supreme Court concluded that similar reasoning should be extended to subsurface rights.¹¹¹ Therefore, in order for litigants to recover in trespass for the sort of subsurface intrusion alleged by the plaintiffs, they must prove "physical damage or actual interference with the reasonable and foreseeable use of the properties."¹¹² Because the plaintiffs had not proven damages or interference with use, the Ohio Supreme Court affirmed the judgment against them.¹¹³

In Boudreaux v. Jefferson Island Storage & Hub, the plaintiffs brought suit under Louisiana law, asserting a trespass claim based on the allegation that the salt water from the defendant's injection disposal well had intruded into the subsurface of their property.¹¹⁴ The United States Fifth Circuit held that the plaintiffs had not established an actionable trespass.¹¹⁵

¹¹⁰ *Id.* at 991-2.

¹¹¹ *Id.* at 992. The court also observed that "ownership rights in today's world are not so clear-cut as they were before the advent of airplanes and injection wells." *Id.*

¹¹² *Id.* at 993.

¹¹³ *Id.* at 994. *See also* Baker v. Chevron USA, Inc., 2009 WL 3698419 (S.D. Ohio 2009). In a Kansas case, the plaintiffs complained about an escape of natural gas from a storage facility. The plaintiffs proceeded on negligence and nuisance claims only, after voluntarily dismissing their trespass claims, so trespass claims were not at issue, but the Kansas Supreme Court referred to the Ohio Supreme Court's rejection of the plaintiff's trespass theory in Chance v. BP and stated that in Kansas the result likely would be the same—a plaintiff could not recover for subsurface trespass without showing damages or unreasonable interference with a foreseeable use of his property. Smith v. Kansas Gas Service Co., 169 P.3d 1052, 1061 (Kan. 2007). In a dispute over subsurface water flows, the Colorado Supreme Court suggested that it found the reasoning of the Ohio Supreme Court to be persuasive, though the Colorado court's decision appears to have been based in large part on Colorado water law. Board of County Commissioners v. Park County Sportsmen's Ranch, LLP, 45 P.3d 693 (Colo. 2002).

¹¹⁴ 255 F.3d 271, 272 (5th Cir 2001).

¹¹⁵ *Id.* at 274. The court seemed to put some weight on the fact that the defendant had received a permit from the Louisiana Department of Conservation to operate the injection disposal well, but that generally should not be a basis for distinguishing the typical cross-border fracturing case because in most or all states the operator of the well will have been required to secure a permit in

The court reasoned that Louisiana law would not allow recovery for subsurface intrusion unless the plaintiff could show actual damages or “measurable inconvenience.”¹¹⁶ Because the plaintiffs had not proven either of those things, they had failed to establish an actionable trespass.¹¹⁷ The mere existence of a physical intrusion was not sufficient.

A respected torts hornbook espouses a similar view. The hornbook criticizes a 1929 Kentucky decision in which the court, “notwithstanding a forceful dissenting opinion,” allowed a surface owner to recover in trespass on the grounds that the defendant had entered the subsurface of plaintiff’s land via a case at a depth of 360 feet below the surface.¹¹⁸ Noting that the plaintiff had no practical access to the case and no prospect for access, the hornbook characterizes the decision as “very bad” and as being “dog-in-the-manger law.”¹¹⁹ The hornbook states that relief should not be allowed in such cases unless there is some damage to the surface or some interference with a plaintiff’s use of the property.¹²⁰ Turning to subsurface intrusions caused by injection disposal and gas storage, the hornbook notes that “[p]erhaps there should be no liability for subsurface invasions of water, gas, or other substances” unless the plaintiff can prove actual

order to drill the well. Prior to *Boudreaux*, the United States District Court for the Eastern District of Louisiana rejected claims in two similar cases based on the same reasoning. *Mongrue v. Monsanto*, 1999 WL 970354 (E.D. La. 1991), *aff’d*, 249 F.3d 422 (5th Cir. 2001); *Raymond v. Union Texas Petroleum Corp.*, 697 F. Supp. 270 (E.D. La. 1988).

¹¹⁶ *Id.* at 275.

¹¹⁷ *Id.*

¹¹⁸ W. Page Keeton, et al., *PROSSER AND KEETON ON TORTS* at Ch. 3, § 13 (p. 82) (5th ed. 1984).

¹¹⁹ *Id.* The “dog-in-the-manger” reference is derived from the Aesop’s Fable in which a dog refuses to let an ox eat hay from a feed trough even though the dog itself cannot eat hay.

¹²⁰ *Id.*

damages, an interference with his use of the property, or, when oil and gas rights are involved, the “unjustifiabl[e] appropriat[ion]” of products.¹²¹

The Restatement (Second) of Torts recognizes that a trespass can occur below the surface,¹²² but this does not necessarily mean that the Restatement would impose liability for intrusions by injections resulting from injection disposal. Liability for trespass is based on entering land “in the possession of the other.”¹²³ The Restatement provides that, to be in possession of land, a person must be in “occupancy” of it.¹²⁴ The comments explain that “occupancy” means “such acts done upon the land as manifest a claim of exclusive control of the land,” and as an example, the comments note that a person’s construction of an enclosure around land generally will qualify as occupancy of the entire area enclosed.¹²⁵ In the typical case in which a landowner complains about injection disposal, the defendant can likely make a strong argument that the complaining landowner does not have possession of the land at the depths where the injection disposal is being done.

3. Conservation Regulation Exceptions to the Ad Coelum Doctrine

Although a company generally has no right to conduct operations on or beneath land unless he owns or leases the land, courts sometimes have found that statutory pooling or unitization of the type described by this article in section II(B)(3) can create an exception to this

¹²¹ *Id.* at 82. In section VI(A), this article explains why, at least in certain circumstances, drainage of oil and gas that is facilitated by cross-boundary fracturing should not be considered an “unjustifiable appropriation.”

¹²² Restatement (Second) Torts § 158. The Restatement (First) of Torts has a similar provision in Section 159.

¹²³ Restatement (Second) Torts § 158. Similarly, Restatement (First) of Torts § 162 states trespass liability is owed [is “owned” the right word here?] [No, it should be “owed.”] only to persons in possession of land.

¹²⁴ Restatement (Second) Torts § 157. Restatement (First) of Torts § 157 has a similar definition of “possession.”

¹²⁵ Restatement (Second) Torts § 157 comment (a). Restatement (First) Torts § 157 comment (a) has a similar definition of “occupancy.”

rule. Thus, in the same way that unitization can provide exceptions to the rule of capture, unitization can modify rules relating to trespass. In Nunez v. Wainoco Oil & Gas Co.,¹²⁶ the Louisiana Commissioner of Conservation entered orders creating a compulsory unit and issued a permit authorizing an operator to drill a well that became the unit well. The drilling began on leased property, near an unleased tract that was part of the unit. After the well was completed, a directional survey indicated that the drilling had deviated from vertical and that the well had bottomed about four or five feet inside the subsurface of the unleased tract. The owner of that neighboring tract brought a trespass action against the operator and other defendants who owned mineral interests in the unit, seeking an order that required the operator to remove the wellbore.

The district court dismissed the action, concluding that it was an improper collateral attack on an order of the Commissioner of Conservation. The appellate court reversed, and remanded the case so that the district court could determine whether a trespass occurred. The Louisiana Supreme Court granted review and dismissed the case, but on different grounds than the district court had done so.

The Supreme Court stated that compulsory unitization converts the separate exploration and development rights held by different persons within the drilling unit into a common interest for the drilling and development of the unit.¹²⁷ The court described the common interest as “a departure from the traditional notions of private property.”¹²⁸ The court then explained that this departure is justified as a “reasonable exercise of the police power” because oil and gas “migrate to points of lower pressure caused by ... drilling,” so that one person’s production of oil or gas affects “the correlative rights” of others who have exploration and development rights that apply

¹²⁶ 488 So.2d 955 (La. 1986).

¹²⁷ *Id.* at 961-2.

¹²⁸ *Id.*

to the “common reservoir.”¹²⁹ Indeed, unitization “protect[s] private property [by] preventing it from being taken by one of the common owners without regard to the enjoyment of the others.”¹³⁰

The court noted that this had “supercede[d] in part” Louisiana’s rule that the surface owner also owns the subsurface, and that the trespass alleged by the plaintiff was a subsurface trespass, not a surface trespass. The court then concluded: “Since established private property law concepts, such as trespass, have been superceded in part by Louisiana’s Conservation Law when a unit has been created by order of the Commissioner, we do not find that a legally actionable trespass has occurred in this instance.”¹³¹

In a subsequent dispute between Nunez and Wainoco, the Louisiana Third Circuit applied the same principle in concluding that unitization orders and the grant of a drilling permit for a particular location can also alter the rules relating to surface trespass. In that subsequent dispute, Nunez complained about Wainoco used a portion of his land while drilling a well just on the other side of the property line. Using a portion of Nunez’s surface during the drilling process had been necessary because, although the well site was not on Nunez’s property, the site designated on the drilling permit was near the property line. The appellate court stated that an operator might be required to compensate the non-consenting landowner for any damages to his property, but the mere use of his land is not a basis for trespass liability if use of the land is necessary in order to drill a unit well at the location specified by the Commissioner of Conservation.

Similarly, the Oklahoma Supreme Court has held that the operator of a pooled unit even has the right to drill a unit well at a surface location owned by a landowner who refuses to give his consent,¹³² though the owner might be entitled to compensation for the value of such use

¹²⁹ *Id.* at 962-3.

¹³⁰ *Id.* at 963 (quoting *Ohio Oil Co. v. Indiana*, 177 U.S. 190 (1900)).

¹³¹ *Id.* at 964.

¹³² *Texas Oil and Gas Corp. v. Rein*, 534 P.2d 1277 (Okla. 1975),

under the Takings Clause of the Oklahoma Constitution.¹³³ Further, the North Dakota Supreme Court has held that, when the state's regulators have created a compulsory unit, an operator does not incur liability for trespass by drilling a horizontal well beneath the property of an unleased owner without that owner's consent.¹³⁴

4. The Rule of Capture, Ownership-in-place, and Non-ownership

Sometimes, a plaintiff complains that a portion of the oil and gas being produced from a neighbor's well is being drained from beneath the plaintiff's land. All states that have addressed such disputes have applied the rule of capture, holding that a person obtains ownership of all oil or gas he produces from a well on his property, even if some of the oil or gas he produces is drained from adjacent land, and that he does not incur liability to the neighboring landowners because of such production.¹³⁵ Sometimes it has been suggested that the rule of capture itself is a limitation on the ad coelum doctrine because, at least in certain circumstances, it protects a person from liability for conducting operations that result in drainage of oil or gas from adjoining properties.

Some address this issue by adhering to a "non-ownership" conception of a landowner's rights with respect to oil and gas located "in place" beneath his property. The jurisprudence of those states hold that a landowner generally has the exclusive right to conduct operations on his property for the purpose of exploring for and producing minerals, but that he does not own the

¹³³ *Cormack v. Wil-Mc Corp.*, 661 P.2d 525, 526-7 (Okla. 1983) (citing Okla. Const. art. 2, sec. 23).

¹³⁴ *Continental Resources, Inc. v. Farrar Oil Co.*, 559 N.W.2d 841, 846 (N.D. 1997). The cases discussed in this section of the article do not figure prominently in the eventual "Model" that this article suggests is the appropriate synthesis of existing subsurface trespass rules, but these cases support the conclusion that there are numerous exceptions to a literal application of the ad coelum doctrine.

¹³⁵ Terence Daintith, *Finders Keepers? How the Law of Capture Shaped the World Oil Industry* 7 (RFF Press 2010)

oil and gas in place beneath his land.¹³⁶ Thus, if a neighbor who is operating on adjoining property drains oil or gas from beneath the landowner's property, the neighbor has not taken or interfered with the landowner's property or ownership rights. Under such a legal theory, the rule of capture is not inconsistent with the ad coelum doctrine, though someone might argue that a state's decision to adhere to a non-ownership theory is in itself a compromise or limitation on the ad coelum doctrine.

On the other hand, there are some states that follow the rule of capture, but nevertheless operate under a theory that a landowner owns the oil and gas in place beneath his property.¹³⁷ The states reconcile their ownership-in-place theory with the rule of capture by holding that a landowner's ownership of oil and gas is lost once those substances migrate from beneath his land and that he generally has no cause of action against a neighbor whose oil or gas well has caused such drainage.¹³⁸ This reconciliation could be viewed as simply a limitation on the nature of

¹³⁶ *Arrowhead Energy, Inc. v. Baron Exploration Co.*, 930 P.2d 181, 182 n.1 (Okla. 1996); *Bonner v. Oklahoma Rock Corp.*, 863 P.2d 1176, 1185 (Okla. 1993); *Gliptis v. Fifteen Oil Co.*, 16 So. 2d 471, 474 (La. 1944); La. Rev. Stat. 31:6. In such states, a person acquires ownership of the oil or gas when he reduces them to possession. *See, e.g.* La. Rev. Stats: 31:6 – 7. Those same states sometimes hold that a landowner does own the solid minerals in place beneath his land. *See, e.g.*, La. Rev. Stat 31:5.

¹³⁷ *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558, 561 (Tex. 1948).

¹³⁸ *Id.*; *see also* *Halbouty v. Railroad Commission*, 357 S.W.2d 364, 375 (Tex. 1962) (referring to “harmoniz[ing]” the rule of capture and ownership-in-place concepts). Because all states hold that a landowner generally has the exclusive right to use his property for exploration and production, and all apply the rule of capture with respect to drainage, it makes little difference in most circumstances whether a state is a non-ownership state or an ownership-in-place state. The difference in theory can make a difference in some contexts. For example, arguably it might make a difference in the measure of damages when a landowner asserts a damages claim against his lessee for breach of the implied covenant to protect against drainage or whether certain mineral rights can be lost by abandonment. *See, e.g.*, Bruce M. Kramer and Owen L. Anderson, *The Rule of Capture: An Oil and Gas Perspective*, 35 *Envtl. L.* 899, 949 (2005); *Gerhard v. Stephens*, 442 P.2d 692, 703-4 (Cal. 1968).

ownership of oil and gas in place, but it also could be viewed as a limitation on a strict application of the ad coelum doctrine.¹³⁹

5. Disputes Involving Secondary Recovery and Similar Production Methods

Disputes regarding secondary recovery present interesting issues regarding the rule of capture, correlative rights, and trespass.

“Primary recovery” refers to the initial stages of production of oil from a reservoir. Because a large portion of oil remains in the ground after primary recovery, companies sometimes engage in secondary recovery in order to recover additional oil. One type of secondary recovery is waterflooding. In waterflooding, several injection wells are used for pumping water into the reservoir that contains oil, to push or flush toward a recovery well a portion of the oil that remains in the ground after primary recovery.¹⁴⁰

Secondary recovery can significantly increase total recovery and is highly favored as a matter of public policy.¹⁴¹ But while total recovery is increased, the pumping of water into the reservoir can cause some wells that are still producing oil to “water out.” Thus, disputes can arise if one or more parties are conducting secondary recovery operations that adversely impact another person’s well and that person either is not receiving a share of the production from the

¹³⁹ Some have criticized the ownership-in-place doctrine as being a legal fiction, suggesting that a more accurate description of the landowner’s rights is presented by the states that follow a non-ownership theory. See, e.g., John G. Sprankling, *Owning the Center of the Earth*, 55 U.C.L.A. L. Rev. 979, 1009-10 (2008) (describing ownership-in-place theory as being “purely rhetorical” and stating that it is “not ownership at all”); see also Terence Daintith, *Finders Keepers? How the Law of Capture Shaped the World Oil Industry* 31-2 (RFF Press 2010) (describing ownership-in-place theory “inconsistent” with the rule of capture followed throughout the U.S. and referring to the “problem of how you could have full ownership—or indeed, any meaningful ownership at all—of a thing that someone could take from you with impunity”). If ownership-in-place is a legal fiction, that undercuts an argument that the rule of capture is an exception to the ad coelum doctrine, as noted above in the discussion of the non-ownership theory.

¹⁴⁰ *Railroad Commission v. Manziel*, 361 S.W.2d 560, 564 (Tex. 1962) (describing waterflooding operation).

¹⁴¹ *Railroad Commission v. Manziel*, 361 S.W.2d 560, 568 (Tex. 1962).

secondary recovery operation or believes his share does not adequately compensate for the watering out of his well.

In Railroad Commission v. Manziel, plaintiffs challenged an order of the Texas Railroad Commission that authorized certain secondary recovery operations that the plaintiffs alleged would cause a subsurface trespass that would water out one of their wells.¹⁴² The Texas Supreme Court held that the plaintiffs had no trespass claim. The court noted that secondary recovery is highly favored, that the disputed operation had been approved by regulators, and that regulators have authority to enter orders to maximize production, minimize waste, and protect correlative rights.¹⁴³ The court upheld the order,¹⁴⁴ and concluded that “a trespass does not occur” if a secondary recovery operation that has been approved by the Railroad Commission pushes fluids across subsurface property lines.¹⁴⁵

But some other courts have been reluctant to insulate secondary recovery operations from liability for trespass, particularly if the plaintiff was not included in the unit and therefore did not share in the proceeds from the secondary recovery operation.¹⁴⁶ Also notable are a series of bromine production cases from Arkansas. Bromine is an element that is used for a variety of purposes, including the manufacture of flame retardants.¹⁴⁷ It is found in salt water—both in

¹⁴² *Id.* at 561-2.

¹⁴³ *Id.* at 568-9.

¹⁴⁴ *Id.* at 574.

¹⁴⁵ *Id.* at 568-9; *see also* Crawford v. Hrabe, 44 P.3d 442 (Kan. 2002). Such a rule is consistent with what one prominent authority called “negative rule of capture,” which would provide that an operator would not incur liability for the injection of substances, even if such injection “results in the displacement under [the land of others] of more valuable with less valuable substances.” Patrick H. Martin and Bruce M. Kramer, WILLIAMS & MEYERS OIL AND GAS LAW § 204.5.

¹⁴⁶ *See, e.g.*, Patrick H. Martin and Bruce M. Kramer, WILLIAMS & MEYERS OIL AND GAS LAW § 204.5 (discussing several cases).

¹⁴⁷ Albemarle Corp. v. Great Lakes Chemical Corp., 2007 WL 4589515 *3 (M.D.La. 2007).

seawater and in many subsurface brines.¹⁴⁸ A high concentration of bromine—meaning about 3,000 to 5,000 parts per million—is found in brines located about 8,500 feet below the surface in certain areas of Arkansas.¹⁴⁹

Often bromine-rich brine is recovered in an operation that is very similar to waterflooding.¹⁵⁰ Bromine-rich “virgin brine” is produced from production wells, much of the bromine is recovered, and then “spent brine” that has a lower concentration of bromine is pumped down injection wells that push more virgin brine toward the production wells.¹⁵¹ This results in a greater flow of virgin brine to the production wells than would result if operators merely pumped brine from the production wells.¹⁵²

In a handful of cases, courts in Arkansas have heard disputes relating to such “secondary recovery” of brine. In Budd v. Ethyl Corporation, the defendants held mineral leases on a block of land about 16,000 acres.¹⁵³ They operated a brine production operation that utilized a number of injection wells on the periphery of the block and a number of production wells in the interior of the block.¹⁵⁴ A plaintiff brought suit, asserting a right to a share of proceeds from the defendants’ brine production, based on his interests in two separate tracts of land, which the court stated “must be discussed separately.”¹⁵⁵

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ Deltic Timber Corp. v. Great Lakes Chemical Corp., 2 F.Supp.2d 1192, 1194 (W.D. Ark. 1998).

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ 474 S.W.2d 411, 412 (Ark. 1972).

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

The first was a 240-acre tract in which the plaintiff held an undivided one thirty-sixth interest in the minerals.¹⁵⁶ The tract was located adjacent to, but outside of, the defendants' lease block.¹⁵⁷ The plaintiff argued that, even though the tract was outside the defendants' ring of injection wells, the defendants' operations were draining brine from beneath the 240-acre tract.¹⁵⁸ The Arkansas Supreme Court rejected the claim, holding that the rule of trespass barred the claim.¹⁵⁹ Thus, the court established that the rule of capture generally will apply to the production of brine under Arkansas law. The second tract was a forty-acre tract located inside the defendants' ring of injection wells.¹⁶⁰ The court did not have to decide whether the rule of capture would apply in the "secondary recovery" context because it rejected the plaintiff's claim relating to the second tract on other grounds.¹⁶¹

But that issue was litigated several years later in Jameson v. Ethyl Corporation.¹⁶² The plaintiff owned land inside the ring of injection wells operated for the secondary recovery of brine.¹⁶³ The operator of the wells previously had attempted to obtain a lease from the plaintiff on terms similar to those in the operator's other leases in the area, but the parties could not reach an agreement.¹⁶⁴ The operator filed suit, seeking a declaratory judgment that its operations were protected by the rule of capture.

The Arkansas Supreme Court held that "the rule of capture should not be extended insofar as operations relate to lands lying within the peripheral area affected" by secondary

¹⁵⁶ Id.

¹⁵⁷ Id. at 412.

¹⁵⁸ Id.

¹⁵⁹ Id. at 412-3.

¹⁶⁰ Id. at 413.

¹⁶¹ Id. at 413-4.

¹⁶² 609 S.W.2d 346 (Ark. 1980).

¹⁶³ Id. at 349.

¹⁶⁴ Id. at 347, 348.

recovery operations.¹⁶⁵ The court concluded that applying the rule of capture in the context of secondary recovery would give extraction companies too much bargaining power in their dealings with landowners.¹⁶⁶

But the Arkansas Supreme Court concluded that the defendant's actions should not be classified as a trespass.¹⁶⁷ The court found that secondary recovery operations are important to society as a means of maximizing recovery of brine, and that brine which is otherwise recoverable would be "wasted if a single landowner is able to thwart secondary recovery processes."¹⁶⁸ Accordingly, the court held that secondary recovery operations "should be permitted, when such operations are carried out in good faith for the purpose of maximizing recovery from a common pool," but that a company conducting such operations would be obligated "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."¹⁶⁹ In effect, the court jurisprudentially provided authority for unitization or pooling for secondary recovery.¹⁷⁰

¹⁶⁵ Id. at 351.

¹⁶⁶ Id.

¹⁶⁷ Id. at 351. In a prior decision, the United States Eighth Circuit had faced the same question and had made an *Erie*-guess that the Arkansas Supreme Court would conclude that subsurface intrusions caused by secondary recovery operations did constitute a trespass. *See Young v. Ethyl Corporation*, 521 F.2d 771 (8th Cir. 1975).

¹⁶⁸ Id.

¹⁶⁹ Id. at 351 By "natural depletion," the court apparently meant the amount of depletion, if any, that would have occurred if the extraction company had conducted only primary recovery operations. *See id.* at 349 (discussing "normal drainage" that would have occurred in the absence of the operator's injection wells). A subsequent federal district court decision reached the same conclusion regarding what is meant by "natural depletion." *See Deltic Timber Corp. v. Great Lakes Chem. Corp.*, 2 F. Supp. 2d 1192, 1195 (W.D. Ark. 1998).

¹⁷⁰ It is not clear if the court thought in terms of providing for unitization, but the court stated: "While Arkansas' unitization laws are not, as previously noted, involved in this case, we do believe that the underlying rationale for the adoption of such laws, i.e., to avoid waste and provide for maximizing recovery of mineral resources, may be interpreted as expressing a public

Thus, courts have reached different conclusions regarding the rights of parties in secondary recovery disputes, though there seems to be a trend against classifying subsurface intrusions caused by secondary recovery operations as being trespasses.

6. Subsurface Trespass Cases Outside the Mineral Law Context

Although a large portion of subsurface trespass disputes arise in the context of mineral recovery or injection disposal operations, such disputes can arise in other contexts. For example, in Boehringer v. Montalto, the plaintiff sold property to the defendant on credit, taking a mortgage and giving a warranty that the property was free from encumbrances.¹⁷¹ The plaintiff later brought an action to foreclose on the mortgage and the defendant counterclaimed, alleging that the plaintiff had breached the warranty because the property was not free from encumbrances.¹⁷² Evidence showed that the Bronx Valley Sewer Commission previously had constructed the sewer beneath the property at a depth of about 150 feet, after acquiring the right to do so by condemnation.¹⁷³ The Commission had not acquired any right to access the sewer via the surface of the property that the plaintiff had sold to the defendant.¹⁷⁴

After briefly taking note of prior disputes regarding ownership of airspace above the property, the court stated that, “It therefore appears that the old theory that the title of an owner of real property extends indefinitely upward and downward is no longer an accepted principle of law in its entirety.”¹⁷⁵ The court concluded that “the title of an owner of the soil will not be

policy of this State which is pertinent to the rule of law of this case.” *Id.* at 351. The court noted that, subsequent to the start of the litigation, Arkansas enacted legislation authorizing statutory unitization for the production of brine. *Id.* at 350 n.1. Before, Arkansas had not provided a statutory basis for unitization for the production of brine. *Budd*, 474 S.W.2d at 413.

¹⁷¹ 254 N.Y.S. 276, 276 (N.Y. Dist. Ct. 1931).

¹⁷² *Id.* at 276-7.

¹⁷³ *Id.* at 277.

¹⁷⁴ *Id.*

¹⁷⁵ *Id.* at 278.

extended to a depth below ground beyond which the owner may not reasonably make use thereof.”¹⁷⁶ The court concluded that the Bronx Valley sewer was located below the deepest depth that the defendant “can conceivably make use of the property.”¹⁷⁷ Accordingly, the Bronx Valley sewer and the Commission’s easement did not encumber the defendant’s property.¹⁷⁸

D. Summary

Courts recognize trespass claims for airspace and subsurface intrusions that occur relatively near the surface of the earth. Further, courts continue to repeat the ad coelum doctrine, which states that a landowner owns the subsurface beneath his land all the way to the center of the earth and the airspace above his property all the way into space. But the full, literal expression of the ad coelum doctrine is dicta. No court has ever applied the doctrine in a case in which parties disputed rights anywhere near the center of the earth or the outer reaches of space. Further, when the courts have faced disputes regarding high elevation and deep subsurface intrusions, they typically have held that a plaintiff cannot recover in trespass unless the intrusion occurred at an elevation or depth that the plaintiff reasonably could be expected to use, or the intrusion caused actual harm or interfered with the plaintiff’s use and enjoyment of his property. Thus, the literal expression of the ad coelum doctrine is not well-established law, but instead is merely oft-repeated dicta.¹⁷⁹

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ Numerous courts and commentators have reached similar conclusions. W. Page Keeton, et al., PROSSER AND KEETON ON TORTS at Ch. 3, § 13 (p. 79) (5th ed. 1984) (describing doctrine as “dictum” and stating that, “No one now advocates that it be applied literally”); United States v. Causby, 328 U.S. 256, 260-1 (1946) ([*ad coelum*] doctrine has no place in the modern world”); Restatement (Second) of Torts, § 159 comment g (noting that the doctrine “has been repeated in many cases in which there has been no question of anything more than the immediate space above the ground” and that the doctrine “can no longer be regarded as law, if it ever was”); Rochester Gas & Electric Corp. v. Dunlop, 266 N.Y.S. 469, 471 (N.Y. Ct. App. 1933) (“it may

IV. HYDRAULIC FRACTURING INTRUSION CASES

The two most important hydraulic fracturing trespass cases are Coastal Oil & Gas Corp. v. Garza Energy Trust, which is a 2008 decision from the Texas Supreme Court, and Stone v. Chesapeake Appalachia, LLC, a diversity jurisdiction case decided by the United States District Court for the Northern District of West Virginia. But there are a handful of earlier cases from Texas that provide interesting background. Those pre-Garza Texas cases are briefly discussed below, followed by discussions of Garza and Stone.

A. Pre-Garza Texas Cases

In Gregg v. Delhi-Taylor Oil Corp., an oil and gas lessee brought suit to enjoin the operator of an adjoining property from performing a hydraulic fracturing operation that the plaintiff believed would result in fractures crossing the property line.¹⁸⁰ The plaintiff asserted that the cross-border fracturing would constitute a subsurface trespass.¹⁸¹ The case went to the Texas Supreme Court on the issue of whether the district court had jurisdiction to hear the case, or whether the Texas Railroad Commission had primary jurisdiction.¹⁸² The Texas Supreme Court decided the only issue that was before it, the jurisdiction question, by holding that the district court had jurisdiction,¹⁸³ but the court's opinion also contained dicta suggesting that a subsurface intrusion of fracturing fluid would constitute a trespass.¹⁸⁴ A companion case, Delhi-

be confidently stated that, if [the ad coelum] doctrine ever meant that the owner of land owned the space above the land to an indefinite height, it is no longer the law").

¹⁸⁰ 344 S.W.2d 411, 412 (Tex. 1961).

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.* at 412, 419.

¹⁸⁴ *Id.* at 416 ("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. To constitute a trespass, 'entry upon another's land need not be in person, but may be made by causing or permitting a thing to cross the boundary of the premises.'").

Taylor Oil Corporation v. Holmes, presented the same jurisdictional issue and was decided in a short opinion that cited Gregg.¹⁸⁵

In Geo Viking, Inc. v. Tex-Lee Operating Co., the owner of a well hired a service company to perform hydraulic fracturing.¹⁸⁶ Due to equipment problems, the fracture did not extend as far as designed, and the owner of the well sued the service company for damages.¹⁸⁷ The jury returned a verdict awarding damages to the owner of the well.¹⁸⁸ The service company appealed, in part based on the trial court's rejection of its argument that the owner of the well could not recover damages for the entire difference between the design fracture length and the actual fracture length.¹⁸⁹ The service company argued that recovery for the entire distance was improper because the designed fracture length would have extended into a neighboring property, thereby committing a trespass and facilitating the recovery of natural gas that the operator of the well had no right to produce.¹⁹⁰

The appellate court rejected the service company's argument, concluding that the argument ran counter to the rule of capture.¹⁹¹ The court therefore affirmed, with only a minor reformation of the judgment regarding an error in the interest calculation.¹⁹² The service company sought rehearing. The court denied rehearing, but with an interesting split. The author of the original opinion changed his mind and dissented from the appellate court's denial of the service company's motion for a rehearing, apparently concluding that a subsurface intrusion of

¹⁸⁵ 344 S.W.2d 420, 421 (Tex. 1961).

¹⁸⁶ 817 S.W.2d 357 (Tex. Ct. App. 1991), *rev'd*, 1992 WL 80263 (Tex. 1992) (per curiam), *withdrawing per curiam decision and denying writ of error*, 839 S.W.2d 797 (Tex. 1992) (per curiam).

¹⁸⁷ *Id.* at 359.

¹⁸⁸ *Id.* at 359-60.

¹⁸⁹ *Id.* at 363-4.

¹⁹⁰ *Id.*

¹⁹¹ *Id.* at 364.

¹⁹² *Id.*

fracturing fluid could constitute a trespass after all.¹⁹³ One of the judges that concurred in the denial of rehearing issued a short opinion, stating that an alleged wrongdoer (the service company) should not be allowed to raise as a defense to its wrongdoing the fact that the plaintiff might not have title to the gas it was seeking to recover.¹⁹⁴

The Texas Supreme Court reversed in a per curiam opinion that declared, “Fracing under the surface of another’s land constitutes a subsurface trespass.”¹⁹⁵ But the Texas Supreme Court later withdrew its initial per curiam decision six months later, issuing a new per curiam decision.¹⁹⁶ The new decision superseded the prior per curiam decision and denied the service company’s request for review.¹⁹⁷ Further, in an apparent effort to make sure that neither the initial per curiam decision nor the new decision was given any value as precedent, the new decision stated, “In denying petitioner’s application for writ of error, we should not be understood as approving or disapproving the opinions of the court of appeals analyzing the rule of capture or trespass as they apply to hydraulic fracturing.”¹⁹⁸ This left in place the appellate court opinion.

Finally, there is Gifford Operating v. Indrex, Inc., a diversity jurisdiction case decided between the first and second per curiam decisions by the Texas Supreme Court in Geo Viking.¹⁹⁹ In that decision, the United States District Court for the Northern District of Texas relied on the

¹⁹³ *Id.* at 364-5 (Grant, J., dissenting from the denial of rehearing).

¹⁹⁴ *Id.* at 364 (Cornelius, J., concurring in denial of rehearing).

¹⁹⁵ 1992 WL 80263 *2 (Tex. 1992).

¹⁹⁶ 839 S.W.2d 797 (Tex. 1992).

¹⁹⁷ *Id.*

¹⁹⁸ *Id.* at 798.

¹⁹⁹ 1992 U.S. Dist. LEXIS 22505 (N.D. Tex. Aug. 7, 1992).

original per curiam decision to hold that a subsurface intrusion of fracturing fluid constituted a trespass.²⁰⁰

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

In Coastal Oil & Gas Corp. v. Garza Energy Trust, the plaintiffs alleged that the defendant had hydraulically fractured wells drilled on land adjacent to the land where the plaintiffs owned a royalty interest (“plaintiffs’ land”), and that the fractures created by the defendant’s operations had intruded into the subsurface of the plaintiffs’ land.²⁰¹ The plaintiffs sought damages, alleging that the fractures had facilitated the drainage of hydrocarbons from beneath their land, and that such drainage had cost them royalty revenue that would have been due to them if the hydrocarbons had been produced by a well located on their land, as opposed to being produced by the defendant’s well on the adjoining property.²⁰² The plaintiffs did not allege any damages other than the loss of royalty revenue.²⁰³

The majority stated that the court need not decide whether the cross-border fracturing was a trespass because it was clear that there was no “actionable trespass.”²⁰⁴ The court explained that the plaintiffs could not recover in trespass without injury, and that the rule of capture barred any recovery for drainage, which was the only injury alleged by the plaintiffs.²⁰⁵ The court described the rule of capture as applying whenever a person produces oil or gas “from a lawful well bottomed on ... property” where the person has a right to operate.²⁰⁶

²⁰⁰ *Id.*

²⁰¹ 268 S.W.3d 1, 4 (Tex. 2008).

²⁰² *Id.* at 8.

²⁰³ *Id.* at 12-3.

²⁰⁴ *Id.*

²⁰⁵ *Id.*

²⁰⁶ *Id.* at 13.

The court justified what its characterized as its adherence to the rule of capture on several grounds. First, Garza stated that a landowner has adequate remedies even without having a trespass claim—namely, the same remedies that a landowner has when he complains about drainage that is caused by a neighboring well that is not hydraulically fractured. For example, he can drill an offset well.²⁰⁷ Or, if his land is under lease, he can demand that his lessee drill an offset well and, if the lessee fails to do so, he can bring suit against his lessee for a breach of the implied covenant to protect against drainage.²⁰⁸ Or, he can seek forced pooling.²⁰⁹

Second, the court stated that the preferable way to govern the production of oil and gas is for the Texas Railroad Commission to use its regulatory authority to balance the rule of capture with appropriate measures to prevent waste and protect correlative rights.²¹⁰ Third, it explained that courts are not well-equipped to determine the amount of drainage, or to take into account social policies in resolving whether a plaintiff has or does not have a viable claim based on subsurface intrusions resulting from hydraulic fracturing.²¹¹

Finally, the court stated that it had received amicus briefs from groups representing a variety of interests, including “regulators, landowners, royalty owners, operators, and hydraulic fracturing service providers,” and that they had all opposed imposing liability for hydraulic fracturing that cross subsurface property lines.²¹² Accordingly, the court concluded that “the law of capture should not be changed to apply differently to hydraulic fracturing.”²¹³

²⁰⁷ *Id.* at 14.

²⁰⁸ *Id.*

²⁰⁹ *Id.*

²¹⁰ *Id.* at 14-5.

²¹¹ *Id.* at 16.

²¹² *Id.* at 16-7.

²¹³ *Id.* at 16.

The result of the decision—that there is no liability for fractures that cross property lines—is defensible, but the court’s reasoning seems flawed. The majority concluded that its rule of capture analysis was sufficient to decide the case and that the court need not determine whether the cross-border fracturing constituted a trespass. But such a conclusion ignores the fact that the rule of capture does not necessarily apply if the capture of oil or gas is made possible by a trespass or other illegal activity. Indeed, Garza itself recognized that the intrusion of a slant well would be a trespass²¹⁴ and that the rule of capture does not necessarily apply if an operator facilitates its production of oil by illegal means.²¹⁵ Thus, the court could not properly ignore the question of whether the defendant had committed a trespass, and if so, how it affected the defendant’s potential liability.²¹⁶

To be fair, the majority opinion was not wholly lacking in trespass analysis. The majority quoted Causby’s statement that a literal application of the ad coelum doctrine “has no place in the modern world.”²¹⁷ The court added, “The law of trespass need no more be the same two miles below the surface than two miles above.”²¹⁸ The court’s rejection of a literal application of the ad coelum doctrine cannot reasonably be assailed, but such a rejection is not the same as

²¹⁴ *Id.* at 13 n.4. In footnote 4, Garza acknowledged that the Texas Supreme Court held in Hastings Oil Co. v. Tex. Co., 234 S.W.2d 389 (1950) that an operator commits a trespass when it drills a well that bottoms on the neighbor’s property. Hastings did not expressly address the applicability of the rule of capture when a slant well trespasses, but it did not need to address the issue because the court in that case affirmed a lower court ruling that enjoined the operator from testing or producing oil from the trespassing well. 234 S.W.2d at 398.

²¹⁵ 268 S.W.3d at 13 n.39. Garza cited a prior case in which the Texas Supreme Court affirmed a lower court ruling that the rule of capture did not protect an operator who had violated the law by illegally using a vacuum pump to facilitate production. *Id.* (citing Peterson v. Grayce Oil Co., 37 S.W.2d 367 (Tex. Ct. App. 1931), *aff’d*, 98 S.W.2d 781 (1936)).

²¹⁶ Other commentators also have noted this flaw in the majority’s reasoning. *See, e.g.*, David E. Pierce, *Minimizing the Environmental Impact of Oil and Gas Development by Maximizing Production Conservation*, 85 N.D. L. Rev. 759, 771-72 (2009) (Professor Pierce refers to this an “obvious flaw” in the court’s reasoning).

²¹⁷ *Id.* at 11.

²¹⁸ *Id.* at 11.

analyzing whether a subsurface intrusion of fracturing fluid constitutes a trespass. In a separate section of the opinion, the majority devoted one paragraph to rejecting the plaintiffs' claim that cross-border fracturing is the equivalent of drilling a slant well that crosses the property line.²¹⁹ The majority stated that the slant drilling situation is distinguishable from fracturing because the capture of oil or gas by a slant well actually occurs under the plaintiff's property, whereas in both a traditional rule of capture case and a fracturing trespass case, the oil or gas drains away and the actual capture takes place on the operator's property.²²⁰ Thus, one can use an offset well to combat drainage in the traditional rule of capture case or the fracturing trespass case, whereas an offset well cannot protect against a trespassing slant well.²²¹

In addition to the majority opinion, there was a concurring opinion and a dissenting opinion. The concurring opinion stated that the court should have ruled that the cross-border fracturing was not a trespass.²²² The concurring justice asserted that public policy strongly favors the use of hydraulic fracturing for purposes of maximizing the production of oil and natural gas and that the court should bar fracturing-based trespass claims in order to avoid the chilling effect such litigation would have on industry's use of the process.²²³ The concurring opinion stated that landowners or royalty owners who feel aggrieved by cross-border fracturing have a self-help remedy (namely, to drill their own wells), that the "orthodox rules" relating to surface trespass were not appropriate for "absolutist" application with respect to subsurface intrusions, and that

²¹⁹ 268 S.W.3d at 13-4.

²²⁰ *Id.*

²²¹ *Id.* at 14.

²²² *Id.* at 35-6 (Willett, J., concurring).

²²³ *Id.* at 26-42 (Willett, J., concurring).

the regulation of fracturing should be left to the Texas Railroad Commission, the state agency that regulates oil and gas matters.²²⁴

The dissenting opinion stated that the court should have reached the issue of whether the cross-border fracturing constituted a trespass.²²⁵ The dissenting justices did not say how they would have decided that issue, but the tone of their opinion suggests that they would have decided the subsurface intrusion of fracturing fluid was a trespass and that such trespass precluded application of the rule of capture.²²⁶

C. *Stone v. Chesapeake Appalachia, LLC*

In *Stone v. Chesapeake Appalachia, LLC*, the plaintiffs asserted claims for trespass.²²⁷ They alleged that the defendant had drilled a well that contained a vertical section about 200 feet from the plaintiffs' property, but that the well's horizontal lateral approached to within "tens of feet" of their property, and that the hydraulic fracturing fluid intruded into the subsurface of their property.²²⁸

The defendants moved for summary judgment on the trespass claim.²²⁹ They argued that the claim was barred by the rule of capture,²³⁰ relying in part on the reasoning of *Garza*,²³¹ but the *Stone* court rejected that argument. *Garza* had supported its conclusion with a traditional justification for the rule of capture—the fact that certain self-help remedies still are available for

²²⁴ *Id.* at 35-6, 38-9 (Willett, J., concurring).

²²⁵ *Id.* at 47 (Johnson, J., dissenting, joined by two additional justices).

²²⁶ *Id.* at 42-7 (Johnson, J., dissenting, joined by two additional justices).

²²⁷ 2013 WL 2097397 *1 (N.D. W. Va.). The plaintiffs also asserted a claim for a breach of the implied covenant to protect against drainage (the defendant was the plaintiffs' lessee) and a breach of contract, with the alleged breach being that the defendant had pooled the plaintiffs' property with other properties for purposes of production from the Marcellus Shale, but that the plaintiffs' lease did not authorize such pooling. *Id.*

²²⁸ *Id.* at *2.

²²⁹ *Id.* at *1.

²³⁰ *Id.* at *2.

²³¹ *Id.* at *4.

landowners concerned about drainage even when the rule of capture applies. Stone acknowledged that the West Virginia Supreme Court had adopted the rule of capture, but Stone still rejected the availability of self-help as a reason to reject a claim for subsurface trespass. Stone explained that self-help remedies are inadequate because some landowners lack the resources to utilize them.²³²

Stone similarly rejected the other reasons that Garza gave in support of its conclusion that “the rule of capture should not be changed.” Stone also relied on the reasoning in Young v. Ethyl Corp., in which the United States Eighth Circuit concluded that the rule of capture should not apply in the context of a brine production process that works much like waterflooding, with water being injected into the subsurface using multiple injection wells in order to push the flow of brine toward a production well.²³³

After concluding that the rule of capture should not apply, and therefore was not a viable defense to the plaintiffs’ trespass claim, Stone turned to the issue of whether there had been a trespass. Stone concluded that there had been a trespass, relying on the fact that the West Virginia Supreme Court previously had stated the ad coelum doctrine governed a landowner’s ownership rights.²³⁴ Accordingly, Stone rejected the defendant’s motion for summary judgment.²³⁵

The result in Stone, like that in Garza, is defensible, but the reasoning in Stone, like that in Garza, is less than satisfactory with respect to the question of whether the defendants’ actions

²³² *Id.* at *6.

²³³ *Id.* at *6 (quoting *Young v. Ethyl Corp.*, 521 F.2d 771 (8th Cir.1975)).

²³⁴ *Id.* at *7-8.

²³⁵ *Id.* at *9.

constituted a trespass.²³⁶ Stone discussed the issue, but its analysis was hardly more thorough than that in Garza, which disclaimed any need to decide whether there had been a trespass. Stone began its discussion of the trespass question by expressly noting Garza's quote from Causby that the ad coelum doctrine "has no place in the modern world,"²³⁷ a quote by which Garza and Causby expressed their conclusion that the doctrine does not apply literally. Stone then contrasted that quote with a quote in which the West Virginia Supreme Court "reaffirmed the maxim" in 2003.²³⁸ But it strains plausibility for Stone to suggest that the ad coelum doctrine applies literally under West Virginia law.

Neither the West Virginia Supreme Court nor any other court has ever applied the doctrine to its full literal extent, and the commentators and courts that have examined the issue have uniformly concluded that the doctrine is mere dicta that does not apply literally.²³⁹ Further, the West Virginia Supreme Court case that Stone quotes was not dealing with hydraulic fracturing or a claim for trespass, or with any other issue that sheds much light on whether subsurface intrusions by fracturing fluid constitute a trespass. Instead, the quoted case merely addressed whether the language of a particular oil and gas lease granted the right to produce coalbed methane.²⁴⁰

²³⁶ The imperfections in the reasoning of Stone are ironic given that Stone projects not merely a rejection of the reasoning in Garza, but complete disdain for it. *See, e.g. id.* at *6 ("The Garza opinion gives oil and gas operators a blank check to steal from the small landowner."); *id.* ("[T]his Court simply cannot believe that our West Virginia Supreme Court would permit such a result.").

²³⁷ *Id.* at *7.

²³⁸ *Id.* at *7 (quoting Drummond v. White Oak Fuel, 104 W.Va. 368, 140 S.E. 57 (1927); Energy Development Corp. v. Moss, 591 S.E.2d 135, 143 n. 14 (2003)).

²³⁹ Thrasher v. City of Atlanta, 173 S.E. 817, 825 (Ga. 1934); Swetland v. Curtiss Airports Corp., 41 F.2d 929, 936-8 (N.D. Ohio 1930); John G. Sprankling, *Owning the Center of the Earth*, 55 U.C.L.A. L. Rev. 979, 999-1003 (2008).

²⁴⁰ Drummond v. White Oak Fuel, 104 W.Va. 368, 140 S.E. 57 (1927); Energy Development Corp. v. Moss, 591 S.E.2d 135, 143 (2003).

V. PROPOSED “TRADITIONAL” TRESPASS MODEL

To properly resolve whether the intrusion of fracturing fluid constitutes an actionable subsurface trespass, a court must examine the nature of a plaintiff’s interest in the subsurface. Neither Garza nor Stone gave proper attention to this issue.

In Garza, the court failed to give this issue appropriate attention because the court concluded that it could resolve the plaintiffs’ claims by a rule of capture analysis alone. The court should have more thoroughly considered whether the defendant’s fracturing across property lines constituted a trespass that precluded application of the rule of capture. In Stone, the court oversimplified the dispute it faced by casually dismissing the possibility that the ad coelum doctrine might not apply at the depths at which the defendants were operating, and that the defendants’ actions therefore might not constitute a trespass. Thus, neither court properly analyzed whether a trespass had occurred.

So what is the proper model or test for analyzing whether a trespass has occurred? If the ad coelum doctrine were given literal application, any subsurface or airspace intrusion could be the basis for a trespass claim. But no one can plausibly deny that the full, literal statement of the ad coelum doctrine is mere dicta and that it always has been mere dicta. Further, there is a clear trend of courts limiting the ability of plaintiffs to recover in trespass for intrusions at high elevation and great depths. Therefore, a model which provides that any subsurface or airspace intrusion constitutes a trespass is not a true expression of the traditional trespass model. Instead, such a model is no more than a purported traditional model.

A true traditional model must be gleaned from the actual holdings of cases, not dicta. Based on the traditional concept that trespass is a claim to vindicate a plaintiff’s right to exclusive possession of property, and the case law dealing with subsurface and airspace trespass,

the most accurate description of trespass law for airspace and subsurface intrusions is that a landowner does not have a claim for airspace or subsurface trespass unless an intrusion occurs: (1) relatively near the surface or (2) at an elevation or depth where a landowner could reasonably be expected to exercise exclusive use of the area in some manner that would not involve the landowner himself likely causing intrusions into another person's airspace or subsurface. In some circumstances, if important public policy concerns provide reasons to limit trespass claims, it will be appropriate to add the additional restriction that a plaintiff cannot recover unless the defendant's conduct unreasonably interferes with the plaintiff's use and enjoyment of his land, as the Restatement (Second) of Torts has done for airspace trespasses.

Support for the accuracy of this description of the true traditional model of airspace and subsurface trespass law comes from the fact that the expression of this model (the "Model") is consistent with the results in most case law involving claims of airspace and subsurface intrusions. For example, the Model would allow liability for low-level intrusions across a plaintiff's land by building protrusions, as well as intrusions by low altitude flights that interfere with his use and enjoyment of his land. But the Model would not impose trespass liability for high altitude flights because a landowner could not reasonably be expected to use such elevations in connection with his use and enjoyment of his land. His only practical use of such elevations would be for his own air travel, which would not be related to his use and enjoyment of his land, and which (as a practical matter) likely would involve him flying over the airspace of other person's property. Such results are consistent with most existing airspace trespass jurisprudence.

This Model is also consistent with the rule that there is no liability for injection disposal operations that result in waste fluids crossing property lines. Such injections typically are made into deep formations that do not contain water that is drinking water quality or commercial

quantities of hydrocarbons. In most cases, a landowner's only use of such a formation below his land would be if he wished to conduct his own injection disposal. But if he does that, the waste fluids that he would discard in the formation eventually would migrate beyond his property if he operated the injection well for any considerable period of time. Thus, the Model provides for the same result as the existing jurisprudence.

VI. APPLYING THE PROPOSED "TRADITIONAL" MODEL TO HYDRAULIC FRACTURING INTRUSIONS

A. Application to "Near Border" Intrusions

This article's "Traditional Model" would preclude trespass liability for subsurface intrusions of hydraulic fracturing fluids, provided that the operator did not design the fracture to go beyond the border, and the operator did not negligently cause the fractures to extend beyond the border for a significantly greater distance than the fractures otherwise would have in the absence of negligence. The reasoning for this result is as follows.

Assume that there is a subsurface formation from which oil or gas can be produced using hydraulic fracturing, but that there is no other practical use of the formation. The length of hydraulic fractures cannot be controlled with precision, though fracture length can be estimated. For purposes of discussion, suppose that the existing state of technology is such that, when companies conduct hydraulic fracturing in the formation, they typically can control fracture lengths within a distance of plus or minus 500 feet (for convenience, this article will sometimes refer to the typical maximum distance between predicated fracture lengths and actual fracture lengths as the "Length of Typical Fracture Uncertainty").²⁴¹ If an operator ("Operator") wanted

²⁴¹ Of course this is a simplification. Logically, the "plus or minus" distance within which fracture length can be controlled should depend on the degree of certainty or confidence that the "error" will not be exceeded. Thus, the "plus or minus" deviation would be greater if a company

to ensure that it did not unintentionally cause fracturing fluid to enter the subsurface of land belonging to the neighbor (the “Neighbor”), the Operator would have to design its projected fracture length to stop 500 feet short of the property line. Assume now that the Neighbor also wants to engage in hydraulic fracturing.²⁴² If the Neighbor wanted to ensure that he did not cause a subsurface intrusion of fracturing fluid, then he would have to design his own fractures to stop 500 feet from the property line.

Thus, neither Operator nor Neighbor can intentionally use the area within 500 feet of the property line, unless they accept the possibility that they might unintentionally cause fractures to cross the property line. But if they design their fractures to extend all the way to the property line, accepting the possibility of unintentional subsurface intrusions, they are each accepting the possibility that they will not have exclusive actual use of the 500 feet of their subsurface that is nearest the property line.

Under the Model, a person would not have a claim for subsurface trespass unless there were an intrusion into an area where he could exercise exclusive use without risking that he will intrude into another person’s subsurface. As applied to Operator and Neighbor, neither of them should have a trespass claim for subsurface intrusions of fracturing fluid that extend less than 500 feet onto their side of the property line (the “Near Border” area), because neither of them can expect to exercise exclusive use of that area without risking the possibility that they will cause subsurface intrusions onto the other’s property.

wanted to be 95-percent certain it would not exceed a particular length than if it was satisfied with being 90-percent certain that it would not exceed a particular length. Further, even for a given percentage confidence level, it might be difficult to define the “plus or minus” distance, and it likely would be different in different formations.

²⁴² If, on the other hand, we assume that Neighbor would never fracture, then the Neighbor would never produce oil or gas from the Formation and thus would not be harmed by drainage because he never would have produced oil or gas from the Formation anyway.

Notably, this means that Operator and Neighbor can each design their own fractures to extend to the property line and still be confident that they will not incur trespass liability, because they typically can control their fracture lengths to within plus or minus 500 feet, which is the depth of the Near Border area within which they will not incur liability for subsurface intrusions. But if they designed their fractures to extend across into the other's subsurface, they would risk trespass liability. Both the ability to design their fractures to extend to the border and the fact that they will risk liability if they design their fractures to go further have an aspect of fairness.

Contrast this with a system that would impose trespass liability even for slight Near Border intrusions. The message such a liability scheme would send is that Operator and Neighbor should each seek to avoid even small subsurface intrusions. They could do that, but only by designing their fractures to stop 500 feet short of the property line. Thus, any gain that either Neighbor or Operator obtained by being less at risk for drainage from the other's fracturing operations would be a purely illusory gain because it would come at a cost of their designing their own fractures to be shorter, and thus to drain less area. Further, if they each designed their fractures to stop 500 feet from the property line, that would result in waste,²⁴³ because it would mean that between the two of them, Neighbor and Operator would leave a 1,000-foot-wide buffer zone (500 feet on each side of the border) that would be left unfractured (unless fractures inadvertently extend beyond the design distance). Thus, there would be waste, without any gain in the protection of correlative rights.

For these reasons, traditional conservation goals of avoiding waste and protecting correlative rights are better served by the Model than by a scheme that imposes trespass liability

²⁴³ Avoidance of waste is a traditional goal of virtually all conservation regulations. *See, e.g.*, La. Rev. Stat. 30:5.

for any subsurface intrusion. But conservation regulations could take additional steps to protect correlative rights. For example, conservation agencies should consider regulations that would actually prohibit an operator from designing its fracturing plan to intentionally extend fractures beyond a property line, into the subsurface of land where the company has no right to operate. Setback rules can be used to prohibit an operator from drilling a horizontal lateral too close to the property line. And if credible evidence shows that an operator's fractures have crossed property lines into the Near Border subsurface of the neighboring property, conservation agencies that have statutory pooling authority should stand ready to use that authority to create a pooled area, or revise an existing pooled area, to ensure that the owner of the neighboring property gets some share of the oil or gas produced by a well that is draining the Near Border area.

B. Application to “Interior Property” Intrusions

The prior section of this article discussed application of the Model to the Near Border area. “Near Border” was defined by reference to the “Length of Typical Fracture Uncertainty,” which was defined as the typical maximum difference between actual fracture lengths and the fracture lengths that were predicted prior to the fracturing operation being performed. The Near Border area was defined as the area within the Length of Typical Fracture Uncertainty from the border. Thus, if the Length of Typical Fracture Uncertainty was 500 feet, the Near Border area would be the area within 500 feet of either side of the border. The area further than 500 feet from the border could be called the Interior Property area (“Interior Property”).

Hydraulic fractures that intrude into the Interior Property areas of a neighboring property raise different issues than those that intrude only into the Near Border area. First, for example, assuming that the operator usually can control the fracture lengths within the Length of Typical Fracture Uncertainty, the intrusion of fractures into the Interior Property of the neighbor

probably means that the operator probably designed its fractures to go beyond the border. That raises fairness issues that are not present when an operator designs his fractures to go no further than the border, but the fractures inadvertently intrude into the Near Border region of the neighbor's subsurface.

Second, if the law allows an operator to routinely fracture into the neighbor's Interior Property, that gives the neighbor the incentive to "go and do likewise"—that is, to fracture into the Interior Property of the land owned or leased by the operator. That creates the potential for economic waste in the form of excessive drilling and fracturing, just as the rule of capture creates an incentive for excessive drilling when the rule is not tempered by such conservation measures as well spacing regulations and statutory pooling.

Third, the neighbor has a stronger property interest in the subsurface of his Interior Property. As noted above, because a person cannot control the length of his hydraulic fractures with precision, he cannot design his fractures to into the Near Border subsurface of his own property unless he is willing to take the chance that his own fractures will cross the border. Thus, a person cannot expect to exercise exclusive use and possession of his own Near Border subsurface, whether or not Near Border intrusions are treated as trespasses. If the law treats Near Border intrusions as trespasses and imposes liability for such intrusions, a person must leave his own Near Border area unfractured in order to avoid the risk that he inadvertently will cause subsurface intrusions into his neighbor's Near Border subsurface because of his inability to precisely control the length of the fractures he creates. On the other hand, if the law does not impose liability for Near Border intrusions, a person can fracture his Near Border subsurface, but he cannot count on having exclusive use and possession of that area because his neighbor will be free to fracture into that area without liability.

In contrast, a person can fracture his Interior Property subsurface without risk of causing fractures to intrude beyond the border, and the same can be said for his neighbor. Thus, a person can exercise exclusive use (by fracturing) of the subsurface of the Interior Property regions of his land. Accordingly, a person has a much stronger property interest in the Interior Property subsurface than in the Near Border subsurface, and a much stronger interest in whether he can bring a trespass claim if someone causes intrusions into that area.

Moreover, given that a person can exercise exclusive use of the Interior Property subsurface without risk that he will intrude into another person's subsurface, the Model for evaluating trespass claims suggests that, under a traditional trespass model, a landowner should be allowed to bring a trespass claim if someone intrudes into that area (unless public policy concerns dictate that a person cannot prevail in trespass unless he also shows actual harm or an actual interference with his use and enjoyment of his property). Such a legal regime would honor traditional conceptions of property rights and trespass, and also would provide some protection for correlative rights.

VII. MODERN MODELS

Arguments can be made for various other potential models for determining trespass liability that would diverge even further from a model based on the literal language of the ad coelum doctrine than does the True Traditional Model described above. For example, the discussion above simplifies the analysis by assuming that there is a specific "plus or minus" distance within which companies can control the length of fractures. Because the potential for fracture length to vary from the *designed* fracture length is more complex than saying that operators can control the length within a single "plus or minus" distance, and because the use of hydraulic fracturing serves public policy, one could argue for some other trespass rule that gives

fracturing operations greater protection against trespass claims.

Indeed, Professor Owen Anderson has made a forceful argument that there generally should not be liability for fracturing intrusions.²⁴⁴ Based on many of the same lines of cases discussed above, as well as public policy arguments, he argues that the current state of the law should be recognized as prohibiting subsurface trespass claims unless the plaintiff demonstrates that the subsurface intrusion reached subsurface areas relatively near the surface and the intrusion interfered with the plaintiff's use and enjoyment of his land. Professor Anderson argues that such a rule would be a mirror image of the Restatement's rule for trespass claims based on aircraft flights over property and that such a rule would serve public policy. His proposal generally would bar subsurface trespass claims based on fractures even if they intrude far beyond a border.

A potential benefit of Professor Anderson's proposal is that it would eliminate litigation over what is the dimension of the Near Borer area. But in order to avoid waste and infringements on correlative rights of the type noted in Section VI(B) of this article, a conservation agency would have to take an active role in managing forced pooling, spacing, and fracturing plans if such a model were used.

Professor David Pierce has argued that the fact that fractures cross property lines should not necessarily be a basis for trespass liability, and that an operator's potential liability should be

²⁴⁴ Owen L. Anderson, *Lord Coke, the Restatement, and Modern Subsurface Trespass Law*, 6 Tex. J. Oil Gas & Energy L. 203 (2010-2011). Professor Anderson argues that the Restatement (Second) of Torts should be revised to give subsurface intrusions a status similar to airspace intrusions by aircraft, so that there is no liability for subsurface trespass unless the intrusion is near the surface of the land and "it interferes substantially with the other's use and enjoyment of is land." *Id.* at 211.

evaluated based on a correlative rights analysis.²⁴⁵ Such a regime would allow for significant flexibility in promoting production, while simultaneously preventing waste and protecting correlative rights, but the effective administration of such a regime also would require conservation agencies to be very active in order to promote their twin mission of preventing waste and protecting correlative rights.

CONCLUSION

There is growing interest in the question of whether a person who is conducting hydraulic fracturing commits an actionable subsurface trespass when he causes fractures to cross into the subsurface of a neighbor's land and those fractures facilitate drainage of hydrocarbons, but otherwise causes no harm to the neighbor. Two courts have addressed this question in recent years, but they reached opposite conclusions and neither provided satisfactory analysis of the trespass question.

The traditional expression of the ad coelum doctrine would suggest that a landowner's ownership includes the entire subsurface of his property, all the way to the center of the earth, as well as to all the airspace above his property, all the way into space. But the traditional expression of that doctrine is mere dicta. Case law recognizes the validity of trespass claims for airspace and subsurface intrusions that occur relatively near the surface, but a clear majority of

²⁴⁵David E. Pierce, *Minimizing the Environmental Impact of Oil and Gas Development by Maximizing Production Conservation*, 85 N.D. L. Rev. 759, 771-72 (2009). Professor Pierce writes that, "It is not a simple trespass issue because each owner overlying the reservoir in fact has rights in the reservoir beneath every other owners' land." *Id.* at 771. He states:

[A]ddressing the issue in a correlative rights context requires that the conduct itself be evaluated to determine whether it is appropriate behavior within the reservoir community. Under a correlative rights analysis, if the hydraulic fracturing is held to be "appropriate behavior within the reservoir community," the resulting drainage will be protected by the rule of capture. On the other hand, if the hydraulic fracturing is held to violate correlative rights of others within the reservoir community, drainage will not be protected by the rule of capture.

Id. at 771 (internal footnotes omitted).

courts that have faced disputes over high elevation intrusions or deep subsurface intrusions have held that a plaintiff cannot recover in trespass for such intrusions absent interference with his use and enjoyment of his property. This majority result, rather than a literal expression of the ad coelum doctrine, is the true expression of the law regarding airspace and subsurface trespass claims.

This paper has proposed a test for determining whether a subsurface intrusion by hydraulic fracturing constitutes a trespass. This “Model” approach combines the established law regarding airspace and subsurface trespass with the traditional concept that claims for trespass are designed to vindicate a plaintiff’s interest in the exclusive possession of property. When this Model is applied to trespass claims that are based on intrusions by hydraulic fractures, it is evident that there should not be liability for such intrusions if they do not extend beyond the property border for a distance greater than the typical “plus or minus” distance within which fracture length can be controlled.

This is because a landowner and his neighbor cannot use such “Near Border” areas of their respective properties for purposes of hydraulic fracturing (the only practical use that can be made of some formations) without risking that they will cause subsurface intrusions into the other’s property. Thus, they cannot have both the actual use and the exclusive possession of the Near Border subsurface of their respective land—they can have only one or another. Under such circumstances, application of the Model demonstrates that neither of them should have trespass claims for Near Border subsurface intrusions by the other.

In contrast, when fractures intrude beyond the Near Border area, a trespass claim should be allowed. A landowner has a greater interest in protecting the interior areas of his property from subsurface intrusions than the Near Border areas. Further, if there were no liability in

trespass for subsurface intrusions beyond the Near Border area, that might prompt neighbors to hydraulically fracture as far as possible into the each other's property, thereby resulting in economic waste in the form of excess fracturing.

Finally, it should be noted that certain public policy arguments favor a "modern" model that would place greater restrictions on subsurface trespass claims, but conservation agencies would need to vigilantly apply conservation regulations in order to prevent waste and protect correlative rights if significantly greater limitations were placed on subsurface trespass claims.