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Hydraulic Fracturing: The Stealthy Subsurface Trespass

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HYDRAULIC FRACTURING: THE STEALTHY SUBSURFACE TRESPASS*

Terry D. Ragsdale†

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I. INTRODUCTION

Standing atop a hill, a farmer gazed suspiciously at his neighbor’s 640-acre tract of land where a parade of noisy, diesel-powered vehicles had been neatly positioned around the well site of the newly drilled well over a half mile away. Based on his familiarity with farming equipment, the farmer surmised that a half dozen of the trucks contained large diesel-driven pumps. The farmer was puzzled, however, to see two dozen vehicles that looked like railroad boxcars. Additionally, a mobile home had been strategically placed such that a person could peer out the window and have a clear view of the pump trucks and the wellhead. Groups of hard-hatted workers with sledge hammers were connecting heavy pieces of steel pipe in a maze that linked the pump trucks, some of the “boxcars,” and the wellhead. Little did the farmer realize, as the diesel engines on the pump trucks strained to their limits, that solid particles suspended in a gelled fluid were extending out from the wellbore through hydraulically created fractures in the reservoir rock, some two miles beneath the ground. The farmer would have been even more surprised to learn that one wing of the fracture even extended into the subsurface beneath his property. After the “frac” job, natural gas situated beneath his property would be drawn into the fracture, which was propped open by the solid particles, and would travel some 3,000 feet to the well on his neighbor’s land.

This article focuses on whether a subsurface entry into an offsetting property, such as the hydraulic fracture operation described above, constitutes an actionable tort. Prior to determining whether tort action might be available, theories of mineral interest ownership advanced by various jurisdictions will be summarized. Second, the feasibility of several potential causes of action will be analyzed: subsurface trespass; conversion; private nuisance; and negligence. Third, case law treatment of these theories of liability in the context of subsurface entries may shed some light on the different ways courts in various jurisdictions might analyze a subsurface entry arising from a hydraulic fracture operation. Fourth, potential plaintiffs and potential defendants will be identified. Fifth, defenses to the various theories will be explored, including public policy and statutes of limitations. Finally, a measure of damages for each theory of liability will be discussed.

II. THEORIES OF OWNERSHIP OF OIL AND GAS RIGHTS

A. *The Ad Coelum Doctrine*

Prior to the advent of the modern commercial oil and gas industry in 1859,¹ the common law phrase "*cujus est solum ejus est usque ad coelum et ad inferos*" evidenced the view that ownership of the surface extended upwards to the heavens and downwards to the center of the earth.² Courts soon discovered that the fugacious nature of oil and gas made strict application of the *ad coelum* doctrine impractical. Application of the traditional *ad coelum* doctrine in the oil and gas context would have obstructed development of an important natural resource by subjecting producers to liability for draining oil and gas from offsetting properties.³ For this reason, courts developed the "rule of capture."

B. *The Rule of Capture*

In *Elliff v. Texon Drilling Co.*⁴ the Texas Supreme Court described the rule of capture:

[C]ourts generally have come to recognize that oil and gas, as commonly found in underground reservoirs, are securely entrapped in a static condition in the original pool, and, ordinarily, so remain until disturbed by penetrations from the surface. It is further established, nevertheless, that these minerals will migrate across property lines towards any low pressure area created by production from the common pool. This migratory character of oil and gas has given rise to the so-called rule or law of capture. That rule simply is that the owner of a tract of land acquires title to the oil or gas which he produces from wells on his land, though part of the oil or gas may have migrated from adjoining lands. He may thus appropriate the oil and gas that have flowed from adjacent lands without the consent of the owner of those lands, and without incurring liability to him for drainage.⁵

1. The first modern commercial oil well was drilled at Titusville, Pennsylvania in 1859. JOHN S. LOWE, *OIL AND GAS LAW* 8 (2d ed. 1988).

2. See generally Osborne M. Reynolds, Jr., *Distinguishing Trespass and Nuisance: A Journey Through a Shifting Borderland*, 44 OKLA. L. REV. 227, 235-38 (1991); LOWE, *supra* note 1, at 8; BLACK'S LAW DICTIONARY 378 (6th ed. 1990).

3. See generally LOWE, *supra* note 1, at 8-9. Even if courts had been disposed to strictly apply the *ad coelum* doctrine to the fledgling petroleum industry, the rudimentary nature of the petroleum engineering discipline at that time prevented accurate estimates of the amount of drainage. *Id.*

4. 210 S.W.2d 558 (Tex. 1948).

5. *Id.* at 561-62. This statement of the rule of capture is generally in accord with the formula offered by commentators:

There is no liability for capturing oil and gas that drains from another's lands. The owner of a tract of land acquires title to the oil and gas that he produces from wells drilled thereon, though it may be proved that part of such oil and gas migrated from adjoining lands.

LOWE, *supra* note 1, at 9.

Thus, the rule of capture, a rule of nonliability, addressed the concern that the *ad coelum* doctrine would discourage vigorous exploration for oil and gas resources.

Recognizing that the rule of capture amounted to a major departure from the common law *ad coelum* doctrine, courts felt constrained to formulate a persuasive rationale for reconciling traditional ownership concepts and the rule of capture. Efforts to justify the rule of capture gave rise to the two dominant theories of ownership of oil and gas rights: (1) the nonownership theory; and (2) the ownership in place theory.⁶

C. Nonownership Theory

Early courts analogized the law of capture to the law of wild animals, holding that the owner of oil and gas rights does not actually own oil and gas until produced (i.e., "captured") from his wellbore.⁷ Thus, prior to the capture of oil and gas, the mineral interest owner merely held a right in the nature of a *profit a prendre*, an exclusive right to explore and develop the property in order to reduce oil and gas to possession.⁸ Jurisdictions adhering to this nonownership theory include California, Louisiana, and Oklahoma.⁹

D. Ownership in Place Theory

In other jurisdictions, courts were reticent to wholly depart from the *ad coelum* doctrine. These courts, adhering to the *ad coelum* doctrine,

6. LOWE, *supra* note 1, at 29. Other commentators have advanced as many as four theories of ownership of oil and gas rights: (1) the nonownership theory; (2) the qualified ownership theory; (3) the ownership in place theory; and (4) the ownership of the strata theory. *See generally* 1 HOWARD R. WILLIAMS & CHARLES J. MEYERS, OIL AND GAS LAW § 203, at 31-32 (1991) (including chart of the view held by particular states). For purposes of this article, the qualified ownership theory will be considered to be subsumed within the nonownership theory, and the ownership of the strata theory will be disregarded.

7. *Westmoreland & Cambria Natural Gas Co. v. DeWitt*, 18 A. 724 (Pa. 1889); *Townsend v. State*, 47 N.E. 19, 21 (Ind. 1897); *see also* WILLIAMS & MEYERS, *supra* note 6, § 203.1, at 33; LOWE, *supra* note 1, at 29.

8. *See, e.g., Nunez v. Wainoco Oil & Gas Co.*, 488 So. 2d 955, 962 (La.), *cert. denied*, 479 U.S. 925 (1986). The Louisiana Supreme Court stated that:

"Ownership of land does not include ownership of oil, gas, and other minerals occurring naturally in liquid or gaseous form, or of any elements or compounds in solution, emulsion, or association with such minerals. The landowner has the exclusive right to explore and develop his property for the production of such minerals and to reduce them to possession and ownership. . . . 1974 La.Acts No. 50, § 6."

Id. at 962 (quoting 1974 La. Acts No. 50, § 6). *See Wright v. Carter Oil Co.*, 223 P. 835, 836 (Okla. 1923) ("[P]roperty in the oil and gas does not become absolute until they are reduced to actual possession by being brought to the surface and then controlled. . . . The right to reduce oil or gas to possession is a valuable property right."). *See also* WILLIAMS & MEYERS, *supra* note 6, § 209, at 96; LOWE, *supra* note 1, at 29-30.

9. WILLIAMS & MEYERS, *supra* note 6, § 203, at 32; LOWE, *supra* note 1, at 30.

reasoned that oil and gas are minerals, and, while remaining in the earth, are part of the realty.¹⁰ In addition to ownership in place of oil and gas, the mineral interest owner retained the exclusive right to explore and develop the property in order to reduce oil and gas to possession.¹¹ Due to the fugacious nature of oil and gas, however, the courts subjected this ownership in place of oil and gas to the rule of capture. The Texas Supreme Court reasoned:

In Texas, and in other jurisdictions, a different rules [sic] exists as to ownership. In our state the landowner is regarded as having absolute title in severalty to the oil and gas in place beneath his land. The only qualification of that rule of ownership is that it must be considered in connection with the law of capture and is subject to police regulations. The oil and gas beneath the soil are considered a part of the realty. Each owner of land owns separately, distinctly and exclusively all the oil and gas under his land. . . .¹²

In addition to Texas, jurisdictions such as Kansas, Mississippi, and New Mexico have espoused the ownership in place theory, the majority view.¹³

E. *Consequences of the Theory of Ownership: The Corporeal-Incorporeal Distinction*

An important consequence of the theory of ownership relates to the corporeal-incorporeal distinction. At common law, a corporeal interest in land included the right of physical possession, whereas an incorporeal

10. See *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558, 561 (Tex. 1948) ("In our state the landowner is regarded as having absolute title in severalty to the oil and gas in place beneath his land. . . . The oil and gas beneath the soil are considered a part of the realty.") (citations omitted); *Bender v. Brooks*, 127 S.W. 168, 170 (Tex. 1910) ("Petroleum oil is a mineral, and while in the earth it is part of the realty . . .") (quoting *Kelley v. Ohio Oil Co.*, 49 N.E. 399, 401 (Ohio 1897)); see also *LOWE*, *supra* note 1, at 30.

11. *Bender*, 127 S.W. at 170. The Texas Supreme Court stated:

"Petroleum oil is a mineral, and while in the earth it is part of the realty, and, should it move from place to place by percolation or otherwise, it forms part of that tract of land in which it tarries for the time being, and, if it moves to the next adjoining tract, it becomes part and parcel of that tract, and it forms part of some tract, until it reaches a well and is raised to the surface, and then for the first time it becomes the subject of distinct ownership separate from the realty, and becomes personal property, the property of the person into whose well it came. And this is so whether the oil moves, percolates, or exists in pools or deposits. In either event, it is property of, and belongs to, the person who reaches it by means of a well, and severs it from the realty and converts it into personalty." Appellants [landowners] had the exclusive right as owners of the soil to take oil therefrom . . .

Id. (quoting *Kelley*, 49 N.E. at 401).

12. *Elliff*, 210 S.W.2d at 561 (citations omitted). Professor *Lowe* likens oil and gas rights in an ownership in place jurisdiction to a fee simple absolute estate in the land and a fee simple determinable in the individual oil and gas molecules that terminates upon capture by an offset well. *LOWE*, *supra* note 1, at 30.

13. *WILLIAMS & MEYERS*, *supra* note 6, § 203, at 32.

right merely included the right to *use* the land.¹⁴ The mineral interest owner in a nonownership state merely holds a *profit a prendre*, an incorporeal right to search for and develop oil and gas from the property.¹⁵ It follows that a landowner in a nonownership state may not sever a separate, corporeal estate in oil and gas from the land. In an ownership in place state, on the other hand, a landowner may sever a distinct corporeal interest in the oil and gas from the land.¹⁶ Finally, a royalty interest is properly classified as an incorporeal interest in both nonownership and ownership in place jurisdictions, since a royalty is a right to oil and gas when produced, not a right to present possession.¹⁷ Theoretically, at least, the corporeal-incorporeal distinction should have consequences for the theories of liability for subsurface trespass.

III. THEORIES OF LIABILITY FOR SUBSURFACE ENTRY

Several potential theories of liability may arise from a subsurface entry into a neighboring oil or gas formation. These theories of liability include: (1) subsurface trespass; (2) conversion; (3) private nuisance; and (4) negligence.¹⁸ While the focus of this article is to analyze potential theories of liability arising from a subsurface entry by means of a hydraulic fracture, very little case law is directly on point. Thus, theories of liability will be developed primarily in the context of two historically common types of subsurface entries: (1) directionally drilled wells; and (2) fluids injected in enhanced recovery projects. Since a hydraulic fracture is both similar to and different from these two types of subsurface entries, cases applying various theories of liability in these two contexts

14. LOWE, *supra* note 1, at 31.

15. WILLIAMS & MEYERS, *supra* note 6, § 209, at 96; Rich v. Doneghey, 177 P. 86, 89 (Okla. 1918).

16. See Humphreys-Mexia Co. v. Gammon, 254 S.W. 296, 299 (Tex. 1923) (severed mineral interest is a corporeal estate); Stephens County v. Mid-Kansas Oil & Gas Co., 254 S.W. 290, 292-93 (Tex. 1923) (oil and gas lessee holds a corporeal interest). See generally WILLIAMS & MEYERS, *supra* note 6, § 209 (noting that some ownership in place jurisdictions (illogically) do not treat both the mineral interest and the oil and gas lessee's interest as corporeal interests).

17. LOWE, *supra* note 1, at 33. A royalty interest is a "right to a share of oil and gas produced free of costs of production." *Id.*

18. As the subsurface trespass theory is by far the most popular liability theory in the context of a subsurface entry, this article will focus primarily on that tort, and other theories of liability will be summarized briefly. The potential theories of liability analyzed in the text are considered the most important; however, the list is by no means exhaustive. For example, the equitable action of assumpsit presumably may be brought against a subsurface trespasser to recover payment under an implied contract for the right of entry that the subsurface trespasser should have obtained. LOWE, *supra* note 1, at 55. Research failed to yield any case law on an assumpsit action against a subsurface trespasser. Other potential theories of liability include violation of a state conservation order and intentional interference with contractual relations. Note, *Suing a Slant-Driller for Subsurface Trespass or Drainage*, 15 STAN. L. REV. 665, 670-73 (1963).

may be analogized to the hydraulic fracture context.¹⁹ The analysis of each theory of liability includes identification of potential plaintiffs and potential defendants. Additionally, defenses appropriate to each theory of liability, such as the public policy defense and the statute of limitations, are discussed. Finally, the measure of damages for each theory of liability is examined.

A. *Subsurface Trespass*

In modern times, the common law tort of trespass constitutes an "intentional and unprivileged use or other invasion of another person's real property."²⁰ The trespasser's action must have substantially caused or permitted the tangible invasion of another person's possessory interests in real property.²¹ In the petroleum context, a subsurface trespass may result from at least three types of subsurface entries into an offsetting reservoir: (1) directionally drilled wells; (2) injected fluids in enhanced recovery projects; and (3) hydraulic fracture operations.²²

1. Directional Well Subsurface Trespass

Drilling a well that (intentionally or inadvertently) deviates from the vertical such that the well makes a subsurface crossing of property lines presents the classical case of subsurface trespass. This subsection will present the general history of the directional well subsurface trespass and

19. A hydraulic fracture is similar to a directionally drilled well in that both operations artificially extend laterally from an imaginary vertical line extending from the surface location of the well through the center of the earth. A hydraulic fracture radically differs from a directional well, however, in the amount of technical control that an operator can exert over the operations. Modern drilling technology, including recent advances in the horizontal well context, often permits an operator to control within a few inches the precise bottom hole location of a directional well. With respect to a hydraulic fracture, however, an operator may be able to influence the height and length, but the properties of the reservoir rock primarily control the direction that the fracture extends.

Like many enhanced recovery projects, a hydraulic fracture operation involves the pumping of fluids down a wellbore and into a formation. Both operations ordinarily require some level of approval from the state conservation agency. Also, both operations have as their goal the recovery of oil and gas that might not otherwise be economically recoverable; in conservation parlance, this translates into the prevention of waste. However, unlike the typical enhanced recovery project, the fluids pumped in a hydraulic fracture operation contain solid particles, called "proppant," which hold the fracture open after the fracture fluids are produced back into the injection wellbore. Also, enhanced recovery injection wells are utilized to sweep hydrocarbons away from the wellbore and toward a producing wellbore, whereas the same wellbore is used to inject fracture fluids into the formation and to produce oil and gas from the formation via the fracture conduit.

20. Reynolds, *supra* note 2, at 227. See generally WILLIAM L. PROSSER, *THE LAW OF TORTS* § 13 (4th ed. 1971).

21. Reynolds, *supra* note 2, at 229, 233.

22. Again, these three types of subsurface entries do not exhaust the potential types of subsurface trespasses. For example, acid pumped in a well stimulation treatment ostensibly could result in a subsurface trespass.

will then examine how both ownership in place jurisdictions and non-ownership jurisdictions have treated a directional well subsurface trespass.

a. History of Directional Well Subsurface Trespass

In the infancy of the petroleum industry, oil wells were drilled in dense geographical patterns throughout an oil field for two reasons. First, at that time, the rule of capture had not yet been limited by the promulgation of conservation statutes.²³ In this *laissez faire* atmosphere, an owner of oil and gas rights had a major incentive to drill as many wells as possible on his property: If the owner drilled fewer wells than his neighbors, oil would be drained from beneath his property.²⁴ In fact, the rule of capture encouraged the owner to drill his wells as close as possible to the property lines. Second, petroleum engineers had not yet determined that a single, strategically placed well was capable of draining a reservoir to a large radial extent from the wellbore. In addition to economic and physical waste, this era of drilling had another unanticipated consequence: inadvertent subsurface trespasses.

These inadvertent trespasses resulted from the drilling of wells very close to property lines. Drillers at that time apparently did not realize that even a "straight" hole tends to drift as the well is drilled.²⁵ Even though many wells drilled during that era undoubtedly constituted subsurface trespasses, petroleum engineers had no surveying instruments which could accurately measure the subsurface location of a wellbore. Thus, the industry operated, for a time, in ignorant bliss of the potential torts of which many operators were both tortfeasor and victim.

23. Using police power, states have adopted conservation statutes to curb the economic and physical waste that resulted from unregulated application of the rule of capture. LOWE, *supra* note 1, at 16-19. Professor Lowe has noted that conservation statutes transformed the rule of capture into a "fair share" doctrine, under which each owner of oil and gas rights is afforded a reasonable opportunity to produce his equitable and ratable share of the oil and gas in a common reservoir. *Id.* at 18; see also *Wronski v. Sun Oil Co.*, 279 N.W.2d 564 (Mich. Ct. App. 1979).

24. LOWE, *supra* note 1, at 15-18.

25. See *Gliptis v. Fifteen Oil Co.*, 16 So. 2d 471 (La. 1943), where the court stated:

It is conceded that during drilling operations some oil and gas wells drilled normally—i.e., without effort to direct their downward course—drift or deviate from a vertical or upright line, and that it frequently happens that a well located on the surface of the owner's land near to his property line deviates or swings so far away from the vertical that it passes through, and is bottomed in, his neighbor's property. When this happens, there is a "subsurface trespass", whether the deviation is normal or whether it is brought about by intentional controlled directional drilling.

Id. at 474.

In the 1930's, however, two technological advances dramatically upset the balance.²⁶ First, drillers developed downhole tools, such as whipstocks, which permitted the drillers to deviate a wellbore toward a neighboring property line.²⁷ The advent of these crude directional drilling tools tempted scurrilous operators to engage in sneaky, but intentional, subsurface trespasses. Second, during this same time period, surveying instruments were developed which could measure the direction and angle of deviation of a wellbore from the vertical.²⁸ This technological advance provided a defense mechanism to landowners suspicious of questionable drilling practices by neighboring operators. In fact, several of the cases discussed in this section arise in the context of a landowner seeking a court order for a subsurface survey of an offset well.²⁹

The abuses associated with this era effectively ended after the East Texas Field "slant hole" scandal broke in the 1960's.³⁰ In the aftermath of that scandal many state conservation agencies began enforcing requirements that operators take and keep inexpensive surveys indicating the angle of deviation at specified drilling depths.³¹ These regulations presumably restricted widespread abuses arising from directional well subsurface trespasses.

In the last few years, horizontal drilling and completion technology has made great strides. Modern drilling techniques now permit operators to accurately place a wellbore within a few inches of a predetermined subsurface location. Overzealous utilization of horizontal drilling technology, however, may trigger renewed allegations of directional well subsurface trespasses.

26. See generally 1 W. L. SUMMERS, THE LAW OF OIL AND GAS § 26, at 86 (1954 & John S. Lowe, Supp. 1990).

27. Union Oil Co. v. Reconstruction Oil Co., 51 P.2d 81, 82 (Cal. 1935) (alleging that defendant had used a whipstock to drill a "crooked-hole" that bottomed on plaintiff's oil and gas lease).

28. *Id.*

29. *E.g., id.* at 83 (holding that a court, under its inherent power to foster proper discovery, could order a subsurface survey of a well alleged to have subsurface trespassed).

30. Schlumberger Well Surveying Corp. v. Nortex Oil & Gas Corp., 435 S.W.2d 854, 855 (Tex. 1968). The Woodbine Sand in the East Texas Field has been one of the most prolific oil reservoirs in North America. The drive mechanism of the Woodbine Sand is a water drive. Thus, downdip wells at the periphery of the field watered out while updip wells continued to produce water-free oil. In the early 1960's, it was discovered that many operators had illegally deviated wells onto neighboring leases in order to get updip in the reservoir to postpone the watering out of their wells. *Id.*

31. SUMMERS, *supra* note 26, § 26, at 87 ("In some states the regulations of conservation agencies require that directional surveys of wells be made and that records thereof be preserved. With such available information a landowner or lessee may learn if his land has been subject to subsurface trespass by adjoining owners.").

b. *Case Law in Ownership in Place Jurisdictions*

A subsurface entry by means of a directional well certainly constitutes a physical invasion of another person's property.³² Since the owner of oil and gas rights in an ownership in place jurisdiction is generally considered to hold a corporeal (possessory) interest in real property,³³ courts in ownership in place jurisdictions have experienced little difficulty in applying the tort of trespass to a subsurface entry by a directional well.³⁴

In 1950, the Texas Supreme Court in *Hastings Oil Co. v. Texas Co.*³⁵ dealt with perhaps the earliest reported case of a directional well subsurface trespass in an ownership in place jurisdiction.³⁶ In that case, the Texas Company sought an injunction for an alleged subsurface trespass. The Texas Company alleged that Hastings had reentered a well on the Mays tract, leased by Hastings, and had sidetracked the hole in a southeasterly direction, by means of a whipstock, such that the well encountered producing formations some 250 feet into the Phillips tract, leased by the Texas Company. The case came to the Texas Supreme Court on the relatively narrow issue of whether the trial court had the authority to issue an order directing an independent expert to perform a directional survey in the face of an allegation of subsurface trespass. Although the court referred in dicta to its inherent power to issue such an order,³⁷ the

32. See *supra* note 20 and accompanying text; see also *McDaniel Bros. v. Wilson*, 70 S.W.2d 618, 621 (Tex. Civ. App. 1934) (defining trespass on land as an act whereby a defendant makes entry onto land without the authorization of the true owner). Note that specific intent to commit a subsurface trespass is not an element. WILLIAMS & MEYERS, *supra* note 6, § 227, at 396.1; W. PAGE KEETON, ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 13 (5th ed. 1984) (stating that trespass typically requires an element of intent to be present, but the intent required may be satisfied by a showing that the trespasser intended to be at the place where the trespass allegedly occurred, regardless of whether the trespasser mistakenly and in good faith believed that he has committed no wrong); PROSSER, *supra* note 20, § 13, at 63 ("The most important of the [ancient] trespass rules to survive was that which imposed liability for invasions of property which were neither intended nor negligent."). The intent of the operator does have a bearing, however, on the damage calculus. See *infra* notes 42-49 and accompanying text.

33. For a discussion of the theory of ownership of oil and gas rights in an ownership in place jurisdiction, see *supra* notes 10-13 and accompanying text. For a discussion of the corporeal nature of oil and gas rights in an ownership in place jurisdiction, see *supra* notes 14-17 and accompanying text.

34. See SUMMERS, *supra* note 26, § 26 ("Where, however, a well deviates from the vertical and produces oil or gas from the lands of another, the courts have uniformly held such act constitutes a trespass for which the injured party is entitled to damages, accounting and injunction.").

35. 234 S.W.2d 389 (Tex. 1950).

36. *Id.*

37. *Id.* at 396; see *Union Oil Co. v. Reconstruction Oil Co.*, 51 P.2d 81 (Cal. 1935) (trial court had inherent power to issue order for a directional survey of a well).

court held that the Texas procedural rules impliedly authorized the order.³⁸ Implicit in the court's holding is the notion that a directional well subsurface trespass, if proved, constitutes an actionable tort; otherwise, a directional survey is irrelevant.³⁹

As *Hastings Oil* demonstrates, a directional well subsurface trespass in an ownership in place jurisdiction raises few issues as to whether the elements of the tort are satisfied. A number of peripheral issues, however, are implicated. One of these issues, the availability of a court ordered directional survey, was addressed by the court in *Hastings Oil*. Other issues raised by a directional well subsurface trespass include: (1) identifying and applying the appropriate statute of limitations; (2) ascertaining the appropriate measure of damages; and (3) identifying potential plaintiffs and potential defendants. The statute of limitations issue is dealt with in a more expansive manner in the subsection on directional well subsurface trespass in nonownership jurisdictions.⁴⁰ Where an action is pursued for subsurface trespass, the statute of limitations for ordinary trespasses generally applies.⁴¹

Ascertaining the measure of damages in a subsurface trespass case largely turns on the issue of intent. Thus, as discussed above, while the subsurface trespasser's intent is irrelevant to determining whether a trespass occurred at all, it is certainly relevant to the measure of damages exacted from the trespasser.⁴² Where a party is characterized as a "good faith" trespasser, courts have uniformly held that the proper measure of damages is the value in place of the oil and gas removed.⁴³ The value of the oil and gas in the reservoir is ordinarily determined by computing the market value of the produced oil and gas and then deducting the reasonable costs expended by the good faith trespasser to produce the oil and

38. *Hastings Oil*, 234 S.W.2d at 393 ("[W]e have concluded that the authority exercised by the trial court is conferred by Rule 737, T.R.C.P., relating to discovery . . ."); see also SUMMERS, *supra* note 26, § 26, at 89 ("Orders for pretrial directional surveys of oil and gas wells in actions for subsurface trespass have been upheld upon the basis of statutes or the inherent power of courts of equity.").

39. The *Hastings Oil* court stated:

[I]t is said that in instances of trespass to mining property greater latitude is allowed courts of equity than in restraining ordinary trespasses to realty, "since the injury goes to the immediate destruction of the minerals which constitute the chief value of this species of property." Trespasses of this character are irreparable because they subtract from the very substance of the estate, hence equity is quick to restrain them.

Hastings Oil, 234 S.W.2d at 398 (citations omitted).

40. See *infra* notes 101-103 and accompanying text.

41. 1 EUGENE KUNTZ, A TREATISE ON THE LAW OF OIL AND GAS § 11.10 (1987).

42. See generally, WILLIAMS & MEYERS, *supra* note 6, § 227, at 390-96.4; KUNTZ, *supra* note 41, §§ 11.3-5.

43. E.g., *Bender v. Brooks*, 127 S.W. 168, 170 (Tex. 1910). Cf. *Payne v. Benavides*, 693 S.W.2d 500, 504 (Tex. Ct. App. 1985).

gas.⁴⁴ The test for good faith has been presented as follows: "To be in good faith in developing a tract of land for oil or gas, one must have both an honest and a reasonable belief in the superiority of one's title."⁴⁵ In the directional well subsurface trespass context, it must be shown that the trespasser reasonably did not realize that the wellbore had wandered into the adjoining property.⁴⁶

The "bad faith" trespasser, on the other hand, has typically been subjected to liability to the extent of the value of the produced oil and gas, without any deduction for the trespasser's costs of production.⁴⁷ One possible exception exists: Where the plaintiff landowner has acted in bad faith by knowingly permitting the trespasser to complete operations

44. In *Bender*, the Texas Supreme Court stated:

"It is the prevailing rule that in an action for unlawfully working a mine and extracting coal or ore therefrom, if the taking was not a willful trespass, but was the result of an honest mistake as to the true ownership of the mine, the measure of damages is the value of the coal or ore as it was in the mine before it was disturbed. The recovery in such case is limited first by the value of what is taken, and second by the cost of mining, extraction, and hoisting to the surface or delivering at the pit's mouth." 20 Am. & Eng. Ency. p. 792. . . . Brooks being an innocent trespasser, the account between him and the landowner should be taken by ascertaining the value of the oil when delivered at the surface or in tanks, deducting the cost of lifting it from the well and placing it in the tanks; the difference would be the sum to which the appellant would be entitled.

Bender, 127 S.W.2d at 170-171; see also KUNTZ, *supra* note 41, § 11.3(a), at 308 ("The measure of damages applied in such an instance [good faith trespass] is the value in place of the . . . substance which was removed. The method of arriving at such value . . . is to determine the value of the substance removed and then to deduct the reasonable costs expended in removing it.").

45. *Payne*, 693 S.W.2d 504, 504 (1985). In requiring the trespasser to have "an honest and a reasonable belief" in the righteousness of his actions, this test for good faith has both subjective and objective components. KUNTZ, *supra* note 41, § 11.5, at 315 ("In general terms, it may be stated that the defendant must have an honest belief in the superiority of his right or title, and such belief must be a reasonable one in the light of the circumstances.").

46. Commentators have noted that the modern practice of routinely surveying drilling wells makes a claim of good faith somewhat suspect. WILLIAMS & MEYERS, *supra* note 6, § 227, at 396.4 ("With the making of directional well surveys a standard oil field practice, most trespasses would seem to be intentional or at least inexcusably negligent."); KUNTZ, *supra* note 41, § 11.5, at 318 ("When . . . a directional survey . . . reveals the trespass, the trespasser immediately becomes a bad faith trespasser, but his bad faith does not have a retroactive effect on his right to recovery costs expended in good faith.").

It is important to note in passing that, with the exception of Oklahoma, the trespasser seeking to deduct production costs from the value of the produced oil and gas bears the burden of establishing his good faith. KUNTZ, *supra* note 41, § 11.5, at 315; *Sapulpa Petroleum Corp. v. McCray*, 277 P. 589 (Okla. 1929).

47. *Bender*, 127 S.W. at 170 ("[A]n intentional trespasser . . . would be responsible for its value without compensation . . . for . . . labor or money expended in producing it."); *Payne*, 693 S.W.2d at 506 ("[T]he measure of damages is 'the value of the things mined at the time of severance without making deduction for the cost of labor and other expenses incurred in committing the wrongful act . . . or for any value he may have added to the mineral by his labor.'" (quoting *Cage Bros. v. Whiteman*, 163 S.W.2d 638, 642 (Tex. 1942)).

prior to asserting his rights, the trespasser may be liable only to the extent of the value in place of the oil and gas.⁴⁸ In addition to the somewhat punitive nature of the bad faith trespass damage formula, a bad faith subsurface trespass may also support an award of exemplary damages.⁴⁹

In addition to the pecuniary damages described above that may be recovered from a good faith or bad faith directional well subsurface trespasser, an injunction is ordinarily available to preclude the continuing trespass.⁵⁰ Courts are more willing to grant an injunction in the case of a subsurface trespass since the harm goes directly to the value of the mineral estate.⁵¹

Identification of potential plaintiffs in a directional well subsurface trespass in an ownership in place jurisdiction is relatively straightforward. The mineral interest owner and the oil and gas lessee of the invaded property represent the most obvious plaintiffs, since the mineral interest owner and lessee own a corporeal interest in realty that has been intentionally invaded.⁵² This requirement that the plaintiff hold a present possessory interest theoretically prevents a lessor from pursuing an action for subsurface trespass, since a lessor ordinarily has retained only a royalty interest, an incorporeal interest.⁵³ The same rationale precludes an overriding royalty interest owner from bringing an action for

48. KUNTZ, *supra* note 41, § 11.3(c), 310. This commentator stated:

The courts have demonstrated a similar lack of sympathy for an owner who is aware of the trespass, but who stands by and awaits the outcome of the operation before asserting his rights. In the instance of a bad faith owner, the defendant trespasser is liable for the value of the substance removed, reduced by the reasonable costs expended in removing it, without regard to the good or bad faith of the defendant.

Id. at 310.

49. *Payne*, 693 S.W.2d at 506 ("A conscious indifference to and disregard of the rights of others, whether displayed while committing a surface trespass or a subsurface trespass, displayed by one who trespasses in bad faith, is sufficient to support an award for exemplary damages."); *Scurlock Oil Co. v. Joffrion*, 390 S.W.2d 526 (Tex. Civ. App. 1965); *see also* KUNTZ, *supra* note 41, § 11.4, at 314.

50. *See WILLIAMS & MEYERS, supra* note 6, § 227, at 396.2-3 ("Even in the case of unintentional directional drilling resulting in good faith subsurface trespass, production from the well may be enjoined, at least where substantial injury results from the trespass."); *SUMMERS, supra* note 26, § 26, at 82 ("The directional drilling of a well through land subject to an oil and gas lease, constitutes a trespass which may be enjoined by the lessee, although such well is bottomed in the trespasser's land."). *But cf. Humble Oil & Ref. Co. v. L. & G. Oil Co.*, 259 S.W.2d 933 (Tex. Civ. App. 1953) (denying an injunction to the mineral interest owner whose surface owner directionally drilled a well to an adjacent lease where the surface owner owned the mineral interest).

51. *Hastings Oil Co. v. Texas Co.*, 234 S.W.2d 389, 398 (Tex. 1950); *see supra* note 39).

52. *PROSSER, supra* note 20, § 13, at 77 ("The action for trespass is designed to protect the interest in exclusive possession of the land in its intact physical condition. Therefore any person in the actual and exclusive possession of the property may maintain the action, although he has no legal title, and is himself in wrongful occupation . . .") (footnotes omitted).

53. Note, *supra* note 18, at 666 ("[T]he . . . [directional well subsurface] trespass action is

subsurface trespass.⁵⁴

Identifying potential defendants in a directional well subsurface trespass is more problematic. Obviously, the operator responsible for drilling the trespassing well is liable for the consequences of his tortious acts.⁵⁵ The more interesting question is whether others may be held liable for a subsurface trespass.⁵⁶ In *Pacific Western Oil Co. v. Bern Oil Co.*,⁵⁷ the jury determined that the corporate defendant, Bern Oil, had intentionally committed a directional well subsurface trespass into the adjacent lease. The jury also found that three individual defendants, officers and shareholders of Bern Oil, by virtue of their "active charge and management of its affairs," had entered into a conspiracy to drill the illegal well.⁵⁸ The California Supreme Court upheld an award of bad faith trespass damages against all defendants.⁵⁹

Besides the trespassing entity and its managing employees, the list of potential defendants could include independent contractors and agents.⁶⁰ In *Schlumberger Well Surveying Corp. v. Nortex Oil & Gas Corp.*,⁶¹ however, the Texas Supreme Court may have severely limited the potential

limited to parties in possession; therefore [the operator lessee] is the only party entitled to bring an action for trespass since only [the lessor's] land has suffered a physical intrusion and [the lessee] has the exclusive right to possession by virtue of the lease from [the lessor]."). The potential liability of a lessee to lessor, where the lessee stands idly by in the face of a subsurface trespass, is beyond the scope of this article.

54. *Cf. Grasty v. Wood*, 230 S.W.2d 568, 571 (Tex. Civ. App. 1950) (overriding royalty interest owner could not maintain action for trespass to try title, which is possessory in nature).

55. KUNTZ, *supra* note 41, § 11.2, at 305.

56. Unfortunately, as one commentator notes, very little case law has probed the limits of potential defendants in this context. *Id.*

57. 87 P.2d 1045 (Cal. 1939).

58. *Id.* at 1046. In affirming a judgment against defendant corporate officers for subsurface trespass, the court conspicuously omitted any discussion of the "piercing of the corporate veil" doctrine. Thus, the officers' liability presumably arose out of their active participation in the trespass, not simply by virtue of their corporate positions. This raises the question of whether other employees of the trespassing entity may be held personally liable for actively participating in the subsurface trespass. For instance, would the liability extend to the entity's drilling engineer or drilling supervisor? To lower level employees? To subcontractors? Narrowly interpreted, *Pacific Western* may be understood to hold that only those corporate officers "in active charge and management" of the subsurface trespass may be held personally liable. *Id.*

59. *Id.* at 1052.

60. *McDaniel Bros. v. Wilson*, 70 S.W.2d 618, 621 (Tex. Civ. App. 1934) (holding owner of lot and independent contractor making excavations thereon jointly and severally liable where plaintiff's building was damaged by virtue of trespass); *Athens & Pomeroy Coal & Land Co. v. Tracy*, 153 N.E. 240 (Ohio Ct. App. 1925), *aff'd*, 152 N.E. 641 (Ohio 1926) (holding that principal (coal mining company) may be held liable for trespass of agent (superintendent of coal mine); however, rejecting notion that punitive damages could be assessed against the company, absent a showing that the president or other general officers of the company authorized, ratified, or participated in the wrongdoing). *But cf. Schlumberger Well Surveying Corp. v. Nortex Oil & Gas Corp.*, 435 S.W.2d 854 (Tex. 1968).

61. 435 S.W.2d 854 (Tex. 1968).

liability of an independent contractor working for a subsurface trespasser.⁶² *Schlumberger* arose out of the infamous East Texas Field slant hole scandal.⁶³ In 1961, Nortex purchased interests in certain oil and gas leases in the East Texas Field. Nortex's predecessors in interest had furnished data showing that oil production from the leases comported with legal requirements. When the East Texas Field slant hole scandal broke in 1962, Nortex discovered that a number of oil wells on its leases had been directionally drilled so as to subsurface trespass across offsetting lease lines. With the value of its leasehold interests thus diminished, Nortex sued Schlumberger, asserting that Schlumberger had participated in a conspiracy with Nortex's predecessor to commit a fraud upon Nortex.

The court outlined, in detail, Schlumberger's role in the case. Schlumberger is a well servicing company that specializes in logging and perforating wells.⁶⁴ Schlumberger had logged and perforated a significant number of wells in the East Texas Field, including four of the illegal directional wells located on the Nortex leases. While it is common knowledge in the oil industry that the Woodbine Sand, the producing formation in the East Texas Field, lies at a vertical depth of from 3,500 feet to 3,800 feet, the wells on the Nortex lease did not encounter Woodbine until logged depths of greater than 4,200 feet; thus, Schlumberger had at least constructive knowledge that the wells had been directionally drilled.⁶⁵

When the East Texas Field slant hole scandal broke, the court noted that Schlumberger had obstructed the official investigation in several ways. First, Schlumberger developed a billing procedure whereby the logging depth of the well was omitted from the customer's bill.⁶⁶ Second, Schlumberger instructed its employees "to have poor memories" when questioned about directional wells.⁶⁷ Finally, Schlumberger destroyed an

62. *Id.*

63. *Id.* at 855-56; see *supra* notes 30-31 and accompanying text.

64. The court described Schlumberger's services as follows:

"Logging" is a service performed by lowering an electronic device into a well to locate the point in the bore hole at which the producing sands lie [sic]. "Perforating" is a service performed by lowering a mechanical device into a well to perforate holes in the well casing at the point where the logging shows the producing sands to lie, so that oil can seep from the sands into the well and be recovered by natural or artificial lift.

Schlumberger, 435 S.W.2d at 856.

65. The length of a directional well, the "logged depth", will always exceed the well's vertical depth, just as the length of the hypotenuse of a right triangle always exceeds the length of either of the other two sides.

66. *Schlumberger*, 435 S.W.2d at 856.

67. *Id.*

extensive library of logs showing the depths of many East Texas wells.⁶⁸ Nortex alleged that these facts, cumulatively, supported a reasonable inference that Schlumberger had joined in a conspiracy with Nortex's predecessors to drill wells which subsurface trespassed on adjacent leases.⁶⁹

At the trial level, the district court judge withdrew the case from the jury after Nortex had presented its evidence.⁷⁰ The case came before the Texas Supreme Court on the issue of whether any evidence existed that Schlumberger had participated in a conspiracy to defraud Nortex.⁷¹ The court concluded that, while Nortex was certainly the victim of a fraud, Nortex failed to link Schlumberger to the conspiracy in two critical respects: (1) "knowledge of the object of the conspiracy," and (2) "[specific] intention to injure adjoining owners."⁷² The court explained its rationale as follows:

For purposes of this opinion, we may assume that Schlumberger had good reason to believe that the conspiracy existed as alleged by Nortex, and that the existence and object of the conspiracy could have been discovered by Schlumberger by the exercise of the slightest degree of diligence. We are unwilling to say, however, that the evidence will support a reasonable inference that Schlumberger had actual knowledge that the four particular wells had been or were to be bottomed under adjoining or adjacent leases for the purpose of producing oil owned by others, or that Schlumberger intended to participate in any such wrong. In the absence of such knowledge and intent, a finding that Schlumberger was a conspirator with the lease owners, drillers and others to bottom the wells beyond the lease lines and wrongfully take the oil of others is insupportable.

There is no evidence that Schlumberger knew the location of the boundary lines of the leases on which the four wells had their surface locations. There is no evidence that Schlumberger knew or was advised that the wells had to be bottomed beyond lease lines in order to produce. . . . There is no evidence that Schlumberger falsified any logs

68. *Id.*

69. *Id.*

70. *Id.* at 855.

71. *Id.*

72. *Id.* at 856. The court defined conspiracy as follows:

A civil conspiracy has been defined by this court as 'a combination by two or more persons to accomplish an unlawful purpose . . . by unlawful means.' . . . It follows that a conspiracy to do nothing more than violate Rule 54 by deviating the four Nortex wells, without a Railroad Commission permit, would have been meaningless as a civil conspiracy without the added plan or scheme to violate another provision of the Rule and bottom the wells under leases of others with the intention of taking the oil of such others.

One without knowledge of the object and purpose of a conspiracy cannot be a co-conspirator; he cannot agree, either expressly or tacitly, to the commission of a wrong which he knows not of.

Id. at 856-57 (citations omitted).

or performed any act to hoodwink the Railroad Commission into granting an allowable to the wells. There is no evidence that Schlumberger shared in any of its customer's ill-gotten gains. The uncontradicted evidence is that Schlumberger was performing a service for which it was paid on a professional basis at its regular and customary rate.⁷³

By narrowly construing the specific intent element, the Texas Supreme Court fashioned a rule in *Schlumberger* which broadly shields a service company from liability based on conspiracy to defraud. It is important to note, however, that the court had no reason to address whether Schlumberger had committed a subsurface trespass by virtue of logging and perforating a directional well bottomed across the lease line.⁷⁴ If the offsetting mineral interest owner had sued Schlumberger for subsurface trespass, Schlumberger's ignorance as to the location of the lease line presumably would be no defense since specific intent is not an element of that tort. The interesting question under these circumstances is whether the full extent of good faith trespasser damages would be recoverable from Schlumberger, solely as a result of its logging and perforating services.⁷⁵

c. Case Law in Nonownership Jurisdictions

Recall that a mineral interest owner in a nonownership jurisdiction is considered to have an interest in the nature of a *profit a prendre*, an exclusive, incorporeal right to use the premises to search for and develop oil and gas.⁷⁶ Strictly adhering to the classical definition of trespass, it would seem theoretically impossible for one to commit a subsurface trespass against a mineral interest owner in a nonownership jurisdiction, since the owner holds only a nonpossessory interest. Courts in nonownership jurisdictions, however, have generally been willing to sidestep this doctrinal dilemma and have applied the same subsurface trespass principles in the directional well context as have courts in ownership in place jurisdictions.

Indeed the earliest directional well subsurface trespass cases arose in a nonownership state. In 1935, the California Supreme Court in *Union*

73. *Id.* at 857-58.

74. *Cf.* *Gifford Operating Co. v. Indrex, Inc.*, No. 2:89-CV-0189 (N.D. Tex. Aug. 7, 1992); *Geo Viking, Inc. v. Tex-Lee Operating Co.*, 817 S.W.2d 357 (Tex. Ct. App. 1991). In *Gifford Operating* and *Geo Viking*, liability is imposed on service companies involved in hydraulic fracture subsurface trespasses. For detailed discussion of these cases, see *infra* notes 137-156 and accompanying text.

75. See *infra* notes 157-158 and accompanying text.

76. See *supra* note 15 and accompanying text.

*Oil Co. v. Reconstruction Oil Co.*⁷⁷ held that a trial court had the inherent power to order a directional survey of defendant's oil well where plaintiff had applied for an injunction to enjoin defendant "from trespassing by means of whipstocking or 'crooked-hole drilling' upon property leased by plaintiff."⁷⁸ With no more than this passing reference, the court implicitly acknowledged directional well subsurface trespass as a viable cause of action in California, a nonownership jurisdiction.

In 1939, the California Supreme Court again considered a directional well subsurface trespass case. In *Pacific Western Oil Co. v. Bern Oil Co.*,⁷⁹ Pacific drilled and completed seven producing wells on a particular oil and gas lease.⁸⁰ After determining that a fault separated the productive portion (parcel A) from the nonproductive portion (parcel B) of its lease, Pacific quitclaimed parcel B to its lessor.⁸¹ Defendants subsequently leased parcel B and drilled three directional wells that intentionally were bottomed on parcel A, Pacific's lease.⁸² Pacific sued to enjoin defendants' operations and to recover bad faith directional well subsurface trespass damages.⁸³ In upholding Pacific's right to recover bad faith trespass damages, the court failed, as it also failed four years earlier in *Union Oil*, to discuss the incongruity in affording the possessory tort of trespass to Pacific, which merely held an incorporeal interest.⁸⁴

Following *Union Oil* and *Pacific Western*, lower courts in California have recognized directional well subsurface trespass as a tort without questioning its application to incorporeal oil and gas rights in a nonownership jurisdiction. In *Hancock Oil Co. v. Meeker-Garner Oil Co.*,⁸⁵ Hancock and Meeker were lessees in oil and gas leases on adjoining tracts.⁸⁶ Meeker secured an easement from Hancock's lessor, who owned the surface, for the purpose of directionally drilling a well from the surface of Hancock's lease to be bottomed on Meeker's lease.⁸⁷ Although Hancock

77. 51 P.2d 81 (Cal. 1935).

78. *Id.* at 81, 83. The court's precise holding was that the trial court's order was interlocutory in nature and, hence, not appealable prior to final judgment. *Id.* at 83. The court further noted that the trial court's order fully protected the defendant from any possible injury by requiring plaintiff to post a bond. *Id.* at 82.

79. 87 P.2d 1045 (Cal. 1939). For a discussion of *Pacific Western* in the context of the liability of corporate officers for subsurface trespass, see *supra* notes 57-59 and accompanying text.

80. *Pacific Western*, 87 P.2d at 1046.

81. *Id.*

82. *Id.*

83. *Id.* at 1047.

84. *Id.* at 1050.

85. 257 P.2d 988 (Cal. Ct. App. 1953).

86. *Id.* at 989.

87. *Id.*

stipulated that Meeker's well did not physically obstruct any of Hancock's operations,⁸⁸ Hancock sued to enjoin the subsurface trespass. Meeker contended that:

[T]he Meeker-Garner well, as drilled—slanted from the surface of [Hancock's lease] into [Meeker's lease] where it was to be bottomed—does not constitute a trespass against either Hancock or the owner-lessors . . . for the reason that the exclusive right to produce oil and gas under the [Hancock] lease is limited to production by Hancock from wells bottomed under the surface of the lots covered by that lease.⁸⁹

In affirming the grant of injunction, the court rejected Meeker's argument, concluding that Meeker had committed a directional well subsurface trespass.⁹⁰ The court explained simply that "one who drills through leased land to cause drainage from it violates the lessee's rights and commits a trespass against him. Such conduct being a trespass against the lessee, it can make no difference that the owner-lessor has consented."⁹¹ The court's perfunctory statement of its rationale sidestepped any discussion of the incorporeal interest of an oil and gas lessee in a nonownership jurisdiction.

Other leading nonownership jurisdictions have followed California's lead in recognizing the directional well subsurface trespass as a viable cause of action.⁹² In *Gliptis v. Fifteen Oil Co.*,⁹³ the Louisiana Supreme Court stated that when a well is deviated from the vertical such that it is bottomed in the neighboring property, "there is a 'subsurface trespass', whether the deviation is normal or whether it is brought about by intentional controlled directional drilling."⁹⁴ Unlike the California courts, the

88. *Id.* at 991.

89. *Id.* at 990.

90. *Id.* at 991.

The trespass here was a subsurface trespass in an oil and gas producing area. It was conceded by plaintiffs on the trial that they could make no such showing as to actual damage as would justify an award of damages in any specific amount. . . . Such concession, however, does not justify the conclusion that plaintiffs had suffered no injury. It has heretofore been held in a case involving a subsurface trespass by way of tunneling that "the injury is irreparable in itself."

Id. (citations omitted).

91. *Id.* at 992.

92. In Louisiana, see *Nunez v. Wainoco Oil & Gas Co.*, 488 So. 2d 955 (La.), *cert. denied*, 479 U.S. 925 (1986); *Gliptis v. Fifteen Oil Co.*, 16 So. 2d 471 (La. 1943); *Reitzell v. Spooner*, 505 So. 2d 829 (La. Ct. App.), *cert. denied*, 507 So. 2d 227 (La. 1987); Note, *Nunez v. Wainoco Oil & Gas Co.: Property Rights—Effects of Louisiana's Oil and Gas Conservation Statute*, 61 TUL. L. REV. 700 (1987). In Oklahoma, see *Edwards v. Lachman*, 567 P.2d 73 (Okla. 1977); *Edwards v. Lachman*, 534 P.2d 670 (Okla. 1974); *Lachman v. Sperry-Sun Well Surveying Co.*, 457 F.2d 850 (10th Cir. 1972).

93. 16 So. 2d 471, 474 (La. 1943) ("Any unlawful physical invasion of the property of another is a trespass.").

94. *Id.*

Louisiana court did not ignore the doctrinal problem of whether one could trespass against the owner of incorporeal oil and gas rights in a nonownership jurisdiction. The court first reaffirmed the notion that a mineral interest owner in Louisiana does not own the oil and gas in place but merely holds "an exclusive right to explore his land for the production of minerals [sic] and to extract therefrom, and reduce to possession and ownership, all such minerals as may be found in the earth beneath the surface of his land."⁹⁵ The court concluded, however, that this ownership right "necessarily excludes the right of any person to invade the subsurface of his neighbor's land and to extract therefrom fugacious minerals, such as oil and gas. Such invasion would be a trespass."⁹⁶ Thus, Louisiana, like California, is willing to overlook the nonpossessory nature of an oil and gas lessee's rights and to permit a cause of action for directional well subsurface trespass.⁹⁷

Like California and Louisiana, Oklahoma also has accepted the directional well trespass as an actionable tort. In three opinions arising from essentially identical facts, courts have definitively dealt with the directional well subsurface trespass under Oklahoma law.⁹⁸ In *Edwards v.*

95. *Id.*

96. *Id.*

97. *Cf.* *Reitzell v. Spooner*, 505 So. 2d 829 (La. Ct. App.) (holding an operator liable for trespass even though he did not participate in the surveying, staking or drilling of a well in the wrong location on the grounds that the operator directed the well to be drilled at the staked location), *writ denied*, 507 So. 2d 227 (La. 1987). *But cf.* *Nunez v. Wainoco Oil & Gas Co.*, 488 So. 2d 955 (La.), *cert. denied*, 479 U.S. 925 (1986). In *Nunez*, the Louisiana Commissioner of Conservation issued an order establishing a compulsory 350-acre drilling unit encompassing several tracts, including Nunez's unleased tract and the Stone tract, leased by Wainoco. When Wainoco received a permit to drill a unit well on the Stone tract, Nunez opted to pay his proportionate share of drilling costs in return for a proportionate share of production rather than retaining a nonparticipating royalty interest. After the well was completed, a directional survey revealed that the well bore had migrated from the Stone tract and had been bottomed in the Nunez tract. Under a subsurface trespass theory, Nunez sued for an injunction ordering Wainoco to remove the well bore. In granting summary judgment to Wainoco, the Louisiana Supreme Court first set forth its definition of subsurface trespass from *Gliptis*. The court distinguished *Gliptis*, however, as not involving a compulsory unitization order from the Commissioner under which private ownership concepts are subjugated to the state's interests in conserving natural resources and protecting the correlative rights of nondrilling landowners. *Id.* at 963. The court summarized its holding as follows:

Therefore, we conclude that the intrusion into the subsurface two miles beneath the tract owned by Adam Nunez was an authorized unit operation. 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.

Id. at 964.

98. *Edwards v. Lachman* (Lachman III), 567 P.2d 73 (Okla. 1977); *Edwards v. Lachman* (Lachman II), 534 P.2d 670 (Okla. 1974); *Lachman v. Sperry-Sun Well Surveying Co.* (Lachman I), 457 F.2d 850 (10th Cir. 1972). For a detailed discussion of the *Lachman* cases, see *infra* notes 99-100 and 108-114 and accompanying text and note 117.

Lachman (Lachman II),⁹⁹ Lachman, lessee of the Fuqua tract, drilled a directional well that bottomed in the adjacent Graham tract in two producing formations, the Dornick Hills and the Springer Sands. Royalty interest owners in the Graham tract and working interest owners in a well drilled on the Graham tract (collectively "Edwards") sued under a subsurface trespass theory for an injunction ordering Lachman to plug back its well to the property line and for an accounting. Evidence at trial revealed that Lachman completed its well in September 1966 but only became aware of the subsurface trespass following a directional survey in April 1967. Lachman did not, however, divulge the survey results to Edwards. The trial court determined, *inter alia*, that Lachman was liable for subsurface trespass. The Oklahoma Supreme Court affirmed the finding of liability but reversed and remanded as to the issue of damages. In the first five pages of its opinion, the court analyzed in detail the issue of whether Lachman should be characterized as a good faith trespasser or a bad faith trespasser; in so doing, the court implicitly accepted the viability of Edwards' cause of action for subsurface trespass even though Edwards held only incorporeal interests.¹⁰⁰

In sum, a number of nonownership jurisdictions have held that an action for directional well subsurface trespass may be maintained in a nonownership jurisdiction by a plaintiff holding only an incorporeal interest. As in the previous subsection on directional well subsurface trespass in ownership in place jurisdictions, a number of peripheral issues merit discussion, including: (1) identifying and applying the appropriate statute of limitations; (2) ascertaining the appropriate measure of damages; and (3) identifying potential plaintiffs and potential defendants. As to the statute of limitations for a directional well subsurface trespass, one nonownership state was so concerned about the potential for litigation that it enacted an extremely short statute of limitations specifically for a

99. 534 P.2d 670 (Okla. 1974).

100. *Id.* at 672-76. Recall that the *Lachman II* plaintiffs were the working interest owners in the well on the Graham tract and the royalty interest owners in the Graham tract. Ordinarily, these types of interests are incorporeal in a nonownership jurisdiction. See *supra* notes 14 to 17 and accompanying text. In accepting the directional well subsurface trespass theory, the court ignored the possessory nature of a traditional trespass action.

Lachman did assert one novel argument, arguing that the rule of capture should be displaced by the ownership in place rule to calculate damages for an innocent trespass. *Lackman II*, 534 P.2d at 676. Lachman contended that expert petroleum engineers could establish that only 47 percent of the total production from Lachman's well bottomed on the adjacent Graham tract actually was drained from the Graham tract, the remaining 53 percent being drained from the Fuqua tract. Thus, Lachman argued that any good faith trespass damages must be reduced by 53 percent. The court rejected Lachman's assertion and retained the rule of capture. *Id.*

directional well subsurface trespass.¹⁰¹ In California, a 180-day statute of limitations is applied to actions based on an unintentional directional well subsurface trespass. For a bad faith trespass, however, the cause of action does not accrue until discovery by the aggrieved party.¹⁰² Other states apply their general statutes of limitations for trespass or conversion to a subsurface trespass.¹⁰³

The damage calculus for a directional well subsurface trespass in a nonownership jurisdiction essentially mirrors that previously discussed for an ownership in place jurisdiction.¹⁰⁴ The subsurface trespassers' intent is again the controlling factor. The good faith trespasser is typically liable only for the value of the oil and gas in place, usually determined by deducting reasonable costs of production from the market value of the oil

101. CAL. CIV. PROC. CODE § 349 3/4 (West 1991) (originally adopted in 1935). This statute provides:

Within one hundred eighty days:

(a) An action to enjoin, abate, or for damages on account of, an underground trespass, use or occupancy, by means of a well drilled for oil or gas or both from a surface location on land other than real property in which the aggrieved party has some right, title or interest or in respect to which the aggrieved party has some right, title or interest.

(b) An action for conversion or for the taking or removing of oil, gas or other liquid, or fluids by means of any such well.

When any of said acts is by means of a new well the actual drilling of which is commenced after this section becomes effective, and such act was knowingly committed with actual intent to commit such act, the cause of action in such case shall not be deemed to have accrued until the discovery, by the aggrieved party, of the act or acts complained of; but in all other cases, and as to wells heretofore or hereafter drilled, the cause of action shall be deemed to have accrued ten days after the time when the well which is the subject of the cause of action was first placed on production.

Notwithstanding the continuing character of any such act, there shall be but one cause of action for any such act, and the cause of action shall accrue as aforesaid.

In all cases where oil or gas has been heretofore or is hereafter extracted from any existing or subsequently drilled well in this State, by a person without right but asserting a claim of right in good faith or acting under an honest mistake of law or fact, the measure of damages, if there be any right of recovery under existing law, shall be the value of the oil or gas at the time of extraction, without interest, after deducting all costs of development, operation and production, which costs shall include taxes and interest on all expenditures from the date thereof.

This section shall apply to causes of action existing when this section becomes effective. The time for commencement of existing causes of action which would be barred by this section within the first one hundred eighty days after this section becomes effective, shall be the said first one hundred eighty days.

Whenever the term "oil" is used in this section it shall be taken to include "petroleum," and the term "gas" shall mean natural gas coming from the earth.

The limitations prescribed by this section shall not apply to rights of action or actions to be brought in the name of or for the benefit of the people of this State, or of any county, city and county, city or other political subdivision of this State.

Id.

102. *Id.*

103. See generally SUMMERS, *supra* note 26, § 26, at 83 & n.82; KUNTZ, *supra* note 41, § 11.10, at 328. A more detailed discussion of the statute of limitations is reserved for the section on conversion.

104. See *supra* notes 42-49 and accompanying text.

and gas removed.¹⁰⁵ In Oklahoma, however, the good faith trespasser may not deduct drilling and completion costs which confer no benefits upon the aggrieved owner of oil and gas rights.¹⁰⁶ Also unique to Oklahoma, the aggrieved party bears the burden of establishing that the trespasser did not act in good faith.¹⁰⁷ The *Lachman* cases arising in Oklahoma exemplify these damage principles.

In *Lachman II*,¹⁰⁸ *Lachman* ostensibly did not discover that it had committed a directional well subsurface trespass until a directional survey was run nearly a year after the well was completed.¹⁰⁹ The Oklahoma Supreme Court held that *Lachman* became a bad faith trespasser following the survey since *Lachman* failed to inform Edwards of the subsurface trespass. The court further held that, since Edwards had not shown that *Lachman* had bad faith when it drilled and completed the offending well, *Lachman's* subsequent knowledge of the subsurface trespass "did not convert them into 'bad faith' trespassers ipso facto."¹¹⁰ As to good faith trespass damages, the court opined that *Lachman* could not (in addition to production costs) deduct drilling and completion costs which conferred no benefit upon Edwards.¹¹¹ The court remanded the

105. *Lachman II*, 534 P.2d at 674; CAL. CIV. PROC. CODE § 349 3/4 (For a subsurface trespass "by a person without right but asserting a claim of right in good faith or acting under an honest mistake of law or fact, the measure of damages . . . shall be the value of the oil or gas at the time of extraction, without interest, after deducting all costs of development, operation and production.").

106. *Lachman II*, 534 P.2d at 675 ("[A]n innocent trespasser, who produces the hydrocarbons of a rightful owner of the oil and gas rights, is not entitled to his drilling and completion costs if by such drilling and completion, no benefits are conferred upon the rightful owner."). A good faith trespasser will always be able to deduct the reasonable costs of production, in contrast to costs of drilling and completion that may or may not confer a benefit upon the rightful owner.

107. See KUNTZ, *supra* note 41, § 11.5, at 315; *Sapulpa Petroleum Corp. v. McCray*, 277 P. 589 (Okla. 1929).

108. 534 P.2d 670 (Okla. 1974).

109. For the background of *Lachman II*, see *supra* notes 99-100 and accompanying text.

110. *Lachman II*, 534 P.2d at 673-74.

111. *Id.* at 675. In determining the extent of the benefits conferred upon Edwards, the court stated that the following factors should be considered by the trial court on remand:

Did the drilling of the [*Lachman*] well tend to prove plaintiffs' land or impart any information to the plaintiffs that would constitute benefits to plaintiffs?; did defendants' production from the Springer Sand, the sand plaintiffs' well did not penetrate and from which it did not produce, confer benefits upon plaintiffs or their property?; and what would the costs have been for plaintiffs to have drilled and completed their well to the Springer Sand?

Id. at 678.

The court excluded some items from consideration on remand. For instance, the court noted that Edwards had not challenged the propriety of permitting a deduction for *Lachman's* lifting costs and gross production taxes. *Id.* at 677. The court also noted that *Lachman* was not entitled to a credit for royalty payments to its royalty owners, since those royalty owners "were not entitled to their proportionate share of the production wrongfully produced from plaintiffs' land." *Id.* Cf. *Pauley v. Faucett*, 269 P.2d 89 (Cal. Ct. App. 1954) (holding that royalty interest owner of land where directional well is surfaced is not entitled to royalty payments where well is bottomed on adjacent tract).

case for a redetermination of Lachman's good faith trespass damages.¹¹²

The primary issue on remand was the determination of the benefit conferred upon Edwards by the Lachman well. Recall that the Lachman well was drilled through two producing formations, the Dornick Hills and the Springer, under Edwards' land. Without knowledge of Lachman's subsurface trespass, Edwards drilled a producer only to the shallower Dornick Hills Sand. The trial court determined that the Edwards well was capable of draining the Dornick Hills without assistance from the Lachman well. The trial court also found that Edwards benefitted from the drilling of the Lachman well from the Dornick Hills to the Springer, but not from the Springer to the total depth of the well. Based on these findings, the Oklahoma Supreme Court, in *Lachman III*,¹¹³ held that Lachman was entitled to deduct only the reasonable cost of drilling from the Dornick Hills at 8,077 feet to the bottom of the Springer at 9,430 feet.¹¹⁴

Finally, the identification of potential plaintiffs and potential defendants for a directional well subsurface action in a nonownership jurisdiction basically tracks the analysis for ownership in place jurisdictions.¹¹⁵ As demonstrated above, leading nonownership jurisdictions, such as California, Louisiana, and Oklahoma, afford a cause of action for directional well subsurface trespass to a plaintiff owner of oil and gas rights despite the notion that the oil and gas interest owner holds only an incorporeal estate. In Oklahoma, courts have even permitted royalty interest owners to maintain an action for subsurface trespass.¹¹⁶ Thus, the incorporeal nature of oil and gas rights in nonownership jurisdictions has not proven to be a limitation on an action for subsurface trespass. Liability for potential defendants, such as the operator of the trespassing well, its officers and employees, its agents, and its independent contractors does not substantially differ from that discussed for ownership in place

112. To summarize, as of *Lachman II*, the following relief had been granted to Edwards as a result of Lachman's directional well subsurface trespass:

1. An injunction ordering Lachman to plug its well back to the property line.
2. An accounting for all hydrocarbons produced from Lachman's well.
3. Good faith trespasser damages up to the time of the directional survey. Lachman could deduct lifting costs and gross production taxes. Lachman could deduct drilling and completion costs to the extent that a benefit was conferred upon Edwards. Lachman could not deduct royalty payments to its royalty owners.
4. Bad faith trespasser damages subsequent to the time of the directional survey.

Lachman II, 534 P.2d at 672, 675, 677-78.

113. 567 P.2d 73 (Okla. 1977).

114. *Id.* at 75-76.

115. See *supra* notes 52-75 and accompanying text.

116. *Lachman II*, 534 P.2d at 672.

jurisdictions.¹¹⁷

2. Injected Fluids Subsurface Trespass

While courts have had little difficulty in applying trespass theory to a directional well subsurface trespass, the issue of a subsurface entry from injected fluids has proven more problematic. Typical scenarios include: (1) pumping salt water (or other fluid) into an injection well as part of an enhanced recovery operation to "sweep" hydrocarbons toward producing wells, thereby recovering reserves incremental to primary recovery; (2) pumping salt water into a well to inexpensively dispose of "waste" fluids in a salt water formation; and (3) injecting natural gas into an underground storage reservoir.¹¹⁸ In each of these scenarios, it is possible for the injected fluids to disperse from the injection well and to make a subsurface entry into an adjoining property, sweeping hydrocarbons from beneath the adjoining property. Aggrieved owners have sued under theories such as subsurface trespass and private nuisance to recover remedies for injected fluid subsurface entries. Due to strong public policies of promoting these types of operations, courts have been cautious in finding liability for injected fluid subsurface entries and in fashioning remedies.

Due to the maturity of oil fields in the United States, enhanced recovery operations have become increasingly important in maximizing incremental recovery over and above recovery from primary operations. Conservation laws in producing states evidence the strong public policy to promote enhanced recovery operations.¹¹⁹ Enhanced recovery fluids pumped into an injection well may inadvertently or unavoidably enter an adjoining property and sweep hydrocarbons from beneath the adjoining property. In the absence of a compulsory unitization order, courts have

117. See *supra* notes 55-75 and accompanying text. One interesting question is whether a directional surveying service company under contract with the operator is liable for breach of contract if the surveyor discloses the subsurface trespass. In *Lachman I*, Lachman contracted with Sperry-Sun to directionally survey a well that had been turnkey-drilled for Lachman by an independent contractor. *Lachman I*, 457 F.2d at 851. Sperry-Sun revealed the survey results to Edwards, the owners of oil and gas rights on the adjoining tract. Edwards subsequently won a judgment for subsurface trespass against Lachman. (See *supra* notes 99-100, 108-114 and accompanying text). Lachman then sued Sperry-Sun for breach of contract. The Tenth Circuit held that, while the non-disclosure provision of the contract was not void on its face, Sperry-Sun's disclosure did not amount to a breach in light of Oklahoma's strong public policy interest in encouraging the disclosure of illegal activity. *Lachman I*, 457 F.2d at 853-854.

118. WILLIAMS & MEYERS, *supra* note 6, § 204.5, at 60; SUMMERS, *supra* note 26, § 28.5, at 12.

119. Railroad Comm'n v. Manziel, 361 S.W.2d 560, 568 (Tex. 1962); SUMMERS, *supra* note 26, § 28.5, at 12.

generally held that an operator may be held liable for a subsurface encroachment by injected fluids in an enhanced recovery operation, at least to the extent that the encroachment reduces the primary recovery from the adjoining property.¹²⁰ Even in the compulsory unitization context, courts have subjected unit operators to limited liability.¹²¹ Thus, the strong public policy to encourage enhanced recovery operations has substantially, but not entirely, shielded unit operators from liability for an

120. *E.g.*, *Jameson v. Ethyl Corp.*, 609 S.W.2d 346 (Ark. 1980). The Arkansas Supreme Court stated the dilemma and a solution as follows:

A determination that a trespass or nuisance occurs through secondary recovery processes within a recovery area would tend to promote waste of such natural resources and extend unwarranted bargaining power to minority landowners. On the other hand, a determination that the rule of capture should be expanded to cover the present situation could unnecessarily extend the license of mineral extraction companies to appropriate minerals which might be induced to be moved from other properties through such processes and, in any event, further extend the bargaining power of such entities to reduce royalty payments to landowners who are financially unable to "go and do likewise"

[W]e . . . are holding that reasonable and necessary secondary recovery processes of pools of transient materials should be permitted, when such operations are carried out in good faith for the purpose of maximizing recovery from a common pool. The permitting of this good faith recovery process is conditioned, however, by imposing an obligation on the extracting party to compensate the owner of the depleted lands for the minerals extracted in excess of natural depletion, if any, at the time of the taking and for any special damages which may have been caused to the depleted property.

Id. at 351. *But see Manziel*, 361 S.W.2d at 568-69:

We conclude that if, in the valid exercise of its authority . . . , the Commission authorizes secondary recovery projects, a trespass does not occur when the injected, secondary recovery forces move across lease lines, and the operations are not subject to an injunction on that basis. The technical rules of trespass have no place in the consideration of the validity of the orders of the Commission.

Id.

121. *E.g.*, *Baumgartner v. Gulf Oil Corp.*, 168 N.W.2d 510 (Neb. 1969), *cert. denied*, 397 U.S. 913 (1970). The Nebraska Supreme Court stated:

Did [defendants] incur liability for willful trespass? We hold they did not. . . .

We have reached the conclusion that where the primary recoverable oil has been exhausted, all interested parties in the field must be offered an opportunity to join in any unitization project to recover secondary oil on a fair and equitable basis, and if any interested party refuses to join he should not be permitted to capitalize on that refusal. To hold otherwise would discourage unitization and encourage rather than avoid waste. Consequently, we hold where a secondary recovery project has been authorized by the commission the operator is not liable for willful trespass to owners who refused to join the project when the injected recovery substance moves across lease lines.

. . . .

Under the facts herein the most that plaintiff should have a right to recover is what he can prove through his own efforts if he had drilled, developed, and operated his property outside the unitization project

Id. at 516, 519. *See also Tidewater Oil Co. v. Jackson*, 320 F.2d 157, 163 (10th Cir.), *cert. denied*, 375 U.S. 942 (1963):

[I]t is safe to assume that, though a water flood project in Kansas be carried on under color of public law, as a legalized nuisance or trespass, the water flooder may not conduct operations in a manner to cause substantial injury to the property of a non-assenting lessee-producer in the common reservoir, without incurring the risk of liability therefor.

Id.; *see generally WILLIAMS & MEYERS, supra* note 6, § 204.5, at 60 (acknowledging that their proposed "negative rule of capture" never developed in the case law, with the exception of *Manziel*).

injected fluids subsurface trespass.¹²²

Where an injected fluids subsurface entry has resulted from the pumping of salt water into a well to inexpensively dispose of "waste" fluids in a salt water formation, courts have been reluctant to award relief for two reasons: (1) the inability of the aggrieved landowner to prove actual harm; and (2) the public policy to prevent economic waste by insuring that wells with a high water cut are not shut in for lack of an inexpensive method of salt water disposal. Here, as in the authorized secondary recovery context, the party that obtains the appropriate permit from the conservation authority is fairly well insulated from liability.¹²³ However, the courts have not entirely foreclosed an action for damages. If the aggrieved landowner can prove harm from offsetting salt water disposal operations, the landowner may pursue an action for injected fluids subsurface trespass.¹²⁴

Finally, where natural gas has been injected into an underground storage reservoir that extends across lease lines, a court has held that title to the injected gas is not lost even though it migrates into offsetting subsurface property.¹²⁵ One commentator has stated that "[t]hough there is

122. The cases analyzing an injected fluids subsurface entry are basically in accord with the foregoing discussion in the text. See *supra* notes 122-124 and accompanying text.

The theory of ownership of a jurisdiction has little influenced the availability of a cause of action for injected fluids subsurface trespass. See WILLIAMS & MEYERS, *supra* note 6, § 204.5, at 60.1-2.

123. *E.g.*, *Raymond v. Union Tex. Petroleum Corp.*, 697 F. Supp. 270 (E.D. La. 1988). Operators of a unitized reservoir received a permit from the Commissioner to dispose of salt water from the entire field (i.e., including non-unit salt water production) in a well located within the unit. Raymond and others owning land within the unit sued the operators under a theory of injected fluids subsurface trespass. The district court held that no legally actionable trespass existed for two reasons. First, while acknowledging that Raymond's petroleum expert had established by a preponderance that the injected salt water had migrated to their subsurface property, the court concluded as a matter of law that Raymond could not prove whether any of the non-unit salt water commingled with the unit salt water had invaded their property. Second, even assuming that Raymond could establish invasion by non-unit salt water, the court held that *Nunez* abrogated traditional property law, such as trespass, when a conflict with conservation orders arises. *Id.* at 273-74; see *supra* note 97. The court's unconvincing first rationale exemplifies the extent to which courts will go to avoid finding an injected fluids subsurface trespass in the context of salt water disposal wells. See also *West Edmond Salt Water Disposal Ass'n v. Rosecrans*, 226 P.2d 965, 969 (Okla. 1950); see generally SUMMERS, *supra* note 26, § 28.5 at 12.

124. *E.g.*, *Snyder Ranches, Inc. v. Oil Conservation Comm'n*, 798 P.2d 587 (N.M. 1990). The New Mexico Supreme Court determined substantial evidence supported the Commission's finding that a sealing fault would prevent migration of salt water from Mobil's disposal well into the salt water zone beneath Snyder Ranches' property. The court noted that Mobil's license to dispose of salt water in the well did not, however, authorize trespass by Mobil nor immunize Mobil from liability for negligence or nuisance. The court concluded, in dicta, that "[i]n the event that an actual trespass occurs by Mobil in its injection operation, neither the Commission's decision . . . nor this opinion would in any way prevent Snyder Ranches from seeking redress for such trespass." *Id.* at 590.

125. *Lone Star Gas Co. v. Murchison*, 353 S.W.2d 870 (Tex. Ct. App. 1962); SUMMERS, *supra* note 26, § 28.5.

inevitably a trespass here, it is to be doubted that an injunction should issue for the trespass is irretrievable when it has occurred, public policy should favor good faith storage efforts, and continuing trespass technicalities aside, the remedy at law in damages actually is sufficient."¹²⁶

3. Hydraulic Fracture Subsurface Trespass

Drawing upon the principles derived from the directional well subsurface trespass cases and from the injected fluids subsurface trespass cases, the following is an analysis of the viability of a cause of action for subsurface trespass in the context of hydraulic fracture. In a hydraulic fracturing operation, a viscous fluid is mixed with a proppant and pumped with sufficient pressure into a well bore to create a crack ("fracture") in the reservoir rock that extends laterally from the well into the producing formation. The proppant is designed to keep the fracture open and to maintain a "highly-conductive drainage path through the tight reservoir rock matrix for oil and gas flowing to the borehole."¹²⁷ Since the lateral direction of the fracture is controlled, not by the operator, but by least compressive stress of the formation rock, a long fracture poses a potential subsurface trespass.¹²⁸

126. *Humble Oil & Ref. Co. v. West*, 508 S.W.2d 812, 816 (Tex. 1974); SUMMERS, *supra* note 26, § 28.5.

127. DETLEF MADER, *HYDRAULIC PROPPANT FRACTURING AND GRAVEL PACKING* xxi (1989). The first hydraulic fracture operation was performed in 1947 in the Hugoton natural gas field in western Kansas. Since that time, operators typically have used hydraulic fractures to accomplish four purposes: (1) surmounting near well bore damage; (2) creating deep-penetrating fractures to enhance well productivity; (3) aiding secondary recovery operations; and (4) assisting in the disposal or injection of salt water or other waste products. GEORGE C. HOWARD & C. ROBERT FAST, *HYDRAULIC FRACTURING* 8-9 (1970). "Proppants" typically utilized range from natural sand grains to synthetic proppants, such as intermediate-strength alumina oxide and silica (ceramic) proppants and high-strength bauxite proppants. DETLEF MADER, *HYDRAULIC PROPPANT FRACTURING AND GRAVEL PACKING* xxi (1989).

Recently, hydraulic fractures have been utilized to facilitate the recovery of methane from coal beds. John Chadwick, *Coalbed Methane Potential*, *MINING MAG.*, July 1991, at 27; S.A. Holditch et al., *Hydraulic Fracturing Accelerates Coalbed Methane Recovery*, *WORLD OIL*, Nov. 1990, at 41.

128. Fracture half lengths (measured from the well bore to the tip of the fracture) typically range from 2,500 to 4,500 feet for right, low permeability gas reservoirs. MADER, *supra* note 127, at 633. See also Bruce A. Matthews et al., *Record Massive Hydraulic Fracturing Treatment Pumped in East Texas Cotton Valley Sands*, *OIL & GAS J.*, Oct. 4, 1982, at 94; *Sand Prop Holds Open Record Frac in E. Texas*, *OIL & GAS J.*, Jan. 1, 1979, at 78. The orientation of the fracture can be horizontal, like a pancake, with the well in the middle, for shallower wells, or vertical, for deeper wells; fracture widths are typically a fraction of an inch, such as 0.1 inches. HOWARD & FAST, *supra* note 127, at 42-43, 91-94. Fracture lengths can be reasonably estimated by petroleum engineers using pressure transient analyses of the well. See C. D. Ebinger & Ercill Hunt, *Pressure Transient Analysis Key to Fracs*, *OIL & GAS J.*, Apr. 17, 1989, at 39. *But cf. Horizontal Well Will Be Employed in Hydraulic Fracturing Research*, *OIL & GAS J.*, May 20, 1991, at 45 (theorizing that hydraulic fractures have shorter lengths than conventional models predict). It is too early to predict whether the recent horizontal drilling craze will adversely affect the number of hydraulic fractures performed; the two techniques are not, however, mutually exclusive. *But cf. Derek A. Reynolds & Ken P. Seymour*,

From both a functional and physical perspective, a hydraulic fracture is largely analogous to a directionally drilled well. In the subsurface trespass context, a hydraulic fracture operation creates an artificially propped crack in the formation that extends into a neighboring lease much as a well can be directionally drilled into a neighboring lease. In both situations, oil and gas are produced from beneath a neighboring lease in a manner not contemplated by the rule of capture.¹²⁹ Given that the only courts to have considered hydraulic fracture subsurface trespasses have acknowledged the directional drilling analogy and since courts in both ownership in place jurisdictions and nonownership jurisdictions have recognized the tort of directional well subsurface trespass, it seems likely that these same courts would entertain an action for hydraulic fracture subsurface trespass.

Until recently, issues surrounding a hydraulic fracture subsurface trespass had only been addressed in the *Delhi-Taylor* cases, four Texas opinions involving the same plaintiff, Delhi-Taylor, seeking to enjoin offsetting operators from committing hydraulic fracture subsurface trespasses.¹³⁰ In *Gregg v. Delhi-Taylor Oil Corp.*,¹³¹ Delhi-Taylor owned a mineral lease adjacent to Gregg's lease. Gregg drilled a gas well only 37.5 feet to the east and 80 feet to the south of Delhi-Taylor's lease and planned to perform a hydraulic fracture operation to increase productivity.¹³² Similarly, in *Delhi-Taylor Oil Corp. v. Holmes*,¹³³ Holmes drilled a well on his mineral lease, a tract only 30 feet wide, which was bounded by Delhi-Taylor's leases. As in *Gregg*, Holmes planned to perform a hydraulic fracture operation on the well.¹³⁴ *Gregg* and *Holmes* arrived as companion cases before the Texas Supreme Court on the issue of whether the Railroad Commission had primary jurisdiction to hear the cases, rather than the district courts.¹³⁵

Horizontal Well Replaces Hydraulic Fracturing in North Sea Gas Well, OIL & GAS J., Nov. 25, 1991, at 71. HOWARD & FAST, *supra* note 127, at 11-12.

129. The rule of capture was premised upon the notion that an operator should not be held liable for drawing oil or gas from across lease lines by virtue of production from a well located on the operator's own lease. See *supra* note 5 and accompanying text.

130. *Gregg v. Delhi-Taylor Oil Corp.*, 344 S.W.2d 411 (Tex. 1961); *Delhi-Taylor Oil Corp. v. Holmes*, 344 S.W.2d 420 (Tex. 1961); *Delhi-Taylor Oil Corp. v. Gregg*, 337 S.W.2d 216 (Tex. Civ. App. 1960), *aff'd*, 344 S.W.2d 411 (Tex. 1961); *Holmes v. Delhi-Taylor Oil Corp.*, 337 S.W.2d 479 (Tex. Civ. App. 1960), *rev'd*, 344 S.W.2d 420 (Tex. 1961). Collectively, these four opinions will be referred to as the *Delhi-Taylor* cases.

131. 344 S.W.2d 411 (Tex. 1961).

132. *Id.* at 412.

133. 344 S.W.2d 420 (Tex. 1961).

134. *Id.*

135. The courts of appeal had split on the issue. *Delhi-Taylor Oil Corp. v. Gregg*, 337 S.W.2d 216 (Tex. Civ. App. 1960) (holding that statutory authority of Railroad Commission to require that wells be drilled and operated in such a manner as to prevent injury to adjacent property did not

Holding that an allegation of hydraulic fracture subsurface trespass is inherently judicial in nature, the court concluded that the courts have jurisdiction to hear the case:

We think the allegations are sufficient to raise an issue as to whether there is a trespass. The invasion is direct and the action taken is intentional. Gregg's well would be, for practical purposes, extended to and partially completed in Delhi-Taylor's land. The pleadings allege a physical entrance into Delhi-Taylor's leasehold. While the drilling bit of Gregg's well is not alleged to have extended into Delhi-Taylor's land, the same result is reached if in fact the cracks or veins extend into its land and gas is produced therefrom by Gregg. 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."¹³⁶

For three decades, dicta from the *Delhi-Taylor* cases stood as the only reported judicial pronouncement on hydraulic fracture subsurface trespass. Two recent cases in Texas, however, have revived the viability of this cause of action. In *Geo Viking, Inc. v. Tex-Lee Operating Co.*,¹³⁷ Tex-Lee hired Geo Viking to sand frac an 8,000-foot well in the Austin Chalk. Although the design "propped" half length was 1,000 feet, the hydraulic fractures extended less than 640 feet due to equipment breakdown during the job. Tex-Lee sued Geo Viking for breach of contract, and a jury determined that Tex-Lee incurred \$300,000 in damages from Geo Viking's failure to frac the well in a workman-like manner. On appeal, Geo Viking contended, *inter alia*, that the trial court erred in refusing to include the following limiting instruction to the jury:

divest district court of authority to issue injunction to prevent an injury to property such as a subsurface trespass), *aff'd*, 344 S.W.2d 411 (Tex. 1961); *Holmes v. Delhi-Taylor Oil Corp.*, 337 S.W.2d 479 (Tex. Civ. App. 1960) (holding that Railroad Commission had primary jurisdiction over *all* methods of drilling, completing, and operating oil and gas wells, including hydraulic fracture operations), *rev'd*, 344 S.W.2d 420 (Tex. 1961). In *Gregg*, the Texas Supreme Court stated:

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

Gregg, 344 S.W.2d at 412.

136. *Holmes v. Delhi-Taylor Oil Corp.*, 344 S.W.2d 411, 416 (Tex. 1961). In so holding, the court rejected the contention that the "law of capture includes the right to capture by artificial means or capture by trespass." *Id.* at 418.

137. 817 S.W.2d 357 (Tex. Ct. App. 1991), *rev'd per curiam*, No. D-1678, 1992 WL 80263 (Tex. Apr. 22, 1992), *withdrawing per curiam decision and denying writ of error*, 839 S.W.2d 797 (Tex. Oct. 28, 1992) (*per curiam*).

In answering Question No. 5, you shall not consider or include the value of the oil and gas reserves, if any, outside the 80 acre unit that would have become recoverable from the White 1 well because of any fracing beyond the boundaries of such unit. In other words, in estimating the value of such oil and gas reserves, if any, you shall consider only those reserves that would have become recoverable as a result of fracing within the boundaries of the lease in question.¹³⁸

In the main opinion, the intermediate appellate court noted that Geo Viking was contending that Tex-Lee had no right to recover oil available due to a frac extending beyond the unit boundary. Ignoring the implications of subsurface trespass, the court simply concluded that this argument ran counter to the rule of capture.¹³⁹

On motion for rehearing, a concurring opinion reasoned that “[i]f Geo Viking is responsible for depriving Tex-Lee of production, it cannot defend on the basis that Tex-Lee might have secured some of that production by trespassing on someone else’s land. That is a matter between Tex-Lee and the other landowner.”¹⁴⁰ Oddly enough, the author of the main opinion dissented on the motion for rehearing.¹⁴¹ Upon reconsideration, this judge agreed with Geo Viking that Tex-Lee’s damages for an improper sandfrac should be limited to “the loss of the oil and gas that Tex-Lee could *legally* obtain through that process.”¹⁴² Surmising that fracing beneath another’s land constitutes a subsurface trespass, the dissenting judge would have limited Tex-Lee’s damages accordingly.¹⁴³

After granting Geo Viking’s application for writ of error, the Texas Supreme Court released a per curiam opinion reversing the intermediate court of appeals.¹⁴⁴ For the first time, the Court directly held that “[f]racing under the surface of another’s land constitutes a subsurface trespass. Therefore, the rule of capture would not permit Tex-Lee to recover for a loss of oil and gas that might have been produced as the result of fracing beyond the boundaries of its tract.”¹⁴⁵ Thus, the trial court abused its discretion in refusing Geo Viking’s limiting instruction.

138. *Id.* at 365.

139. *Id.* at 364. (“The remedy of an injured land owner under such circumstances is generally said to be self-help.”). Read broadly, this conclusion implies that there are no restraints on fracturing across lease lines.

140. *Id.*

141. The main opinion held sway, however, as the dissenting judge could not persuade the other judges in the panel of three to change their minds. *Id.* at 364-65.

142. *Id.* at 365 (emphasis in original).

143. *Id.* (relying on dictum from *Gregg v. Delhi-Taylor Oil Corp.*, 344 S.W.2d 411 (Tex. 1961)).

144. *Geo Viking, Inc. v. Tex-Lee Operating Co.*, No. D-1678, 1992 WL 80263, at *1 (Tex. Apr. 22, 1992) (per curiam), *withdrawn and writ of error denied per curiam*, 839 S.W.2d 797 (Tex. 1992).

145. *Geo Viking*, 1992 WL 80263, at *2 (citations omitted).

The Court remanded the case for a new trial on the issue of damages.¹⁴⁶

Six months after releasing the foregoing opinion, the Texas Supreme Court withdrew that opinion and judgment and withdrew the grant of application for writ of error.¹⁴⁷ In so doing, the Court let stand the court of appeals' decision that had been reversed, albeit with questionable precedential value.¹⁴⁸

At the same time the *Geo Viking* case was making its tortuous pass through the Texas state courts, a federal district court in Texas was also considering a case involving a hydraulic fracture subsurface trespass. In *Gifford Operating Co. v. Indrex, Inc.*,¹⁴⁹ Gifford and Indrex operated wells on adjacent leases. Indrex first completed the Frye #2-48 well. After hydraulically fracturing the well, Indrex placed the Frye well on production at 200 barrels of oil per day and 850 MCF of gas per day.¹⁵⁰ Gifford subsequently completed the Stanley #1-49 well at a location some 2,640 feet west of the Frye well.¹⁵¹ Gifford hired Dowell Schlumberger Inc. ("DSI") to fracture treat the Stanley well with proppant designed to extend 2,886 feet from the well. Almost simultaneously with the fracture treatment of the Stanley well, the Frye well experienced a decrease in production and died the next day.¹⁵² Frac fluid and proppant were recovered in the wellbore of the Frye well. By the time Indrex, through remedial operations, was able to return the Frye well to production, the rate had dropped to 50 barrels of oil per day and 190 MCF of gas per day.¹⁵³

Ironically, Gifford, which also held a working interest in the Frye well, sued to remove Indrex as operator. Indrex counterclaimed against Gifford and DSI for negligence and subsurface trespass. The federal district court specifically found that Gifford and DSI had designed the fracture treatment of the Stanley well in "deliberate disregard for the lease lines" and that the fracture had indeed crossed the Frye lease line.¹⁵⁴

146. *Id.* at *3.

147. *Geo Viking, Inc. v. Tex-Lee Operating Co.*, 839 S.W.2d 797 (Tex. 1992) (per curiam).

148. The court stated that "[i]n 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." *Id.* at 798.

149. Court's Findings of Fact and Conclusions of Law No. 2:89-CV-0189 (N.D. Tex. Aug. 7, 1992). None of the parties in the *Gifford* case chose to perfect an appeal on the merits from the decision of the district court. The reader should note that the author's law firm represented Indrex in *Gifford* but that the decision was rendered prior to the time the author joined the firm.

150. *Id.* at 6-7. According to a fracturing model, the fracture on the Frye well extended 1,324 feet in propped frac length. The Frye well was located 1319 feet from the *closest* lease line. *Id.*

151. *Id.* at 7. The Stanley well was located 1329 feet from the nearest lease line. *Id.*

152. A well which ceases to produce for any reason is said to have "died."

153. *Gifford*, No. 2:89-CV-0189, slip. op. at 10.

154. *Id.* at 11.

The court relied on the Texas Supreme Court's opinion in *Geo Viking*, which had not yet been withdrawn, as authority for the proposition that "sand fracturing across lease lines amounts to subsurface trespass."¹⁵⁵ Thus, the court held Gifford and DSI liable for subsurface trespass.¹⁵⁶

Geo Viking and *Gifford Operating* are important cases for several reasons. First, *Gifford Operating* stands as the only decision directly holding that a hydraulic fracture across lease lines constitutes a subsurface trespass. While dicta in the *Delhi-Taylor* cases support *Gifford Operating*, the withdrawal of the Texas Supreme Court's opinion in *Geo Viking* leaves the intermediate appellate opinion in *Geo Viking* somewhat at odds with *Gifford Operating*.¹⁵⁷ Second, both *Geo Viking* and *Gifford Operating* permitted recovery from the service companies performing the hydraulic fracture operations. Therefore, the protections seemingly afforded to service companies in *Schlumberger* as to conspiracy actions may not extend to subsurface trespass actions.¹⁵⁸

While the foregoing Texas cases establish the viability of a cause of action for hydraulic fracture subsurface trespass, many issues remain unresolved. For example, will nonownership jurisdictions recognize the subsurface trespass cause of action in the hydraulic fracture context as in the directional well context?¹⁵⁹ May even a royalty interest owner maintain a cause of action?¹⁶⁰ Will establishing to a preponderance that a hydraulic fracture subsurface trespass indeed occurred prove insurmountable?¹⁶¹ Will courts revise the damage calculus to account for the

155. *Id.* at 13-14.

156. *Id.* at 15. In so holding, the court expressly rejected DSI's contention that "sand fracturing across lease lines is not an actionable trespass because of a public policy to prevent waste." *Id.* at 14 (citing *Amarillo Oil Co. v. Energy-Agri Prod.*, 794 S.W.2d 20, 27 (Tex. 1990)).

157. Note that the Texas Supreme Court withdrew its opinion in *Geo Viking* after the expiration of the period to file an appeal in *Gifford Operating*.

158. For a discussion of *Schlumberger Well Surveying Corp. v. Nortex Oil & Gas Corp.*, 435 S.W.2d 854 (Tex. 1968), see *supra* notes 61-75 and accompanying text.

159. See *supra* notes 76-117 and accompanying text for a discussion of directional well subsurface trespass in nonownership jurisdictions.

160. Compare *Edwards v. Lachman*, 534 P.2d 670, 672 (Okla. 1974) (*Lachman II*) (permitting a royalty owner to maintain a cause of action for directional well subsurface trespass) with Note, *supra* note 18, at 666 ("[T]he [directional well subsurface] trespass action is limited to parties in possession; therefore [the operator lessee] is the only party entitled to bring an action for trespass since only [the lessor's] land has suffered a physical intrusion and [the lessee] has the exclusive right to possession by virtue of the lease from [the lessor].").

161. In the directional well subsurface trespass context, surveying instruments can establish to a near certainty the precise bottom hole location of a well bore. Under present petroleum engineering technology, the direction of a hydraulic fracture cannot ordinarily be estimated. The length of the fracture can, however, be estimated using established empirical equations. In the *Delhi-Taylor* cases, the defendants' wells were so close to the boundary lines that little doubt existed that hydraulic fractures would have extended into plaintiffs' subsurface. In *Gifford Operating*, the hydraulic fracture extended directly into an adjacent well. In the typical hydraulic subsurface trespass, the prof

unique nature of a hydraulic fracture subsurface trespass?¹⁶² Will the public policy of fostering techniques to enhance oil and gas production make courts reluctant to put a roadblock in the path of operators seeking to perform hydraulic fracturing operations?¹⁶³

B. Other Theories

1. Conversion

In addition to the tort of subsurface trespass, plaintiffs have pursued relief under a conversion theory for a subsurface entry by an adjacent landowner.¹⁶⁴ In the directional well subsurface entry context, courts have permitted the aggrieved landowner to recover conversion damages for oil and gas produced from the trespassing well.¹⁶⁵ The good faith,

may be more elusive. This determination is obviously factual in nature and should ordinarily be determined by the trier of fact based on the testimony of expert petroleum engineers.

162. The good faith, bad faith dichotomy ordinarily determines the damage calculus for the tort of subsurface trespass. See *supra* notes 42-49 and accompanying text. This makes sense for a directional well subsurface trespass, where all of the oil and gas are produced into the well bore from beneath the aggrieved landowner's land. In a hydraulic fracture subsurface trespass, however, hydrocarbons enter the fracture both from beneath the aggrieved landowner's lease and the trespasser's lease. Expert petroleum engineers ostensibly could estimate the contribution from each lease. In fact, the Texas Supreme Court's withdrawn opinion in *Geo Viking* contemplated precisely this limitation on Tex-Lee's damage recovery. The Oklahoma Supreme Court may have foreclosed such an argument. *Edwards v. Lachman*, 534 P.2d 670, 676 (Okla. 1974) (rejecting Lachman's contention that in calculating damages the rule of capture should be displaced by the ownership in place rule for an innocent trespass). See *supra* note 100. Also, the question remains whether a court will be as willing to enjoin production from a hydraulic fracture subsurface trespassing well given that only a fraction of the production comes from the adjacent lease via the fracture.

163. As seen in the injected fluids subsurface trespass context, the public policy of encouraging enhanced recovery operations prompted some courts to alter the damage calculus. See *supra* notes 121-122 and accompanying text. Given that many tight gas sands would not produce economically in the absence of lengthy hydraulic fractures, it is possible that a court may similarly disfavor a cause of action for hydraulic fracture subsurface trespass. For instance, a court could limit damages to the incremental production from the trespassing well that is facilitated by the portion of the fracture that extends into the offsetting lease as discussed in *supra* note 162. Note, however, that the court in *Gifford Operating* rejected the argument that the public policy to prevent waste insulates a party from liability for hydraulic fracture subsurface trespass. See *supra* note 156.

164. See generally PROSSER, *supra* note 20, § 15; Note, *supra* note 18, at 666 & n.6 ("Trove is the technical name of the cause of action used to recover damages for a conversion of personal property of another, conversion being the intentional, unauthorized assumption of the right of ownership over that personal property."); Allen H. Barr, Comment, *Oil and Gas: Liability and Damages for Underground Trespasses*, 27 CAL. L. REV. 192, 194 (1939). Although conversion actions have traditionally been limited to parties in or entitled to possession, California courts have extended a conversion cause of action to even nonpossessory interest owners on the theory that the important interest to be protected is the ownership interest, not merely possession. PROSSER, *supra* note 20, § 15; Note, *supra* note 18, at 666-68.

165. *Pan Am. Petroleum Corp. v. Long*, 340 F.2d 211 (5th Cir. 1964), *cert. denied sub nom. Southwestern Life Ins. Co. v. Pan Am. Petroleum Corp.*, 381 U.S. 926 (1965); *Harrington v. Texaco, Inc.*, 339 F.2d 814 (5th Cir. 1964), *cert. denied*, 381 U.S. 915 (1965); *Pan Am. Petroleum Corp. v. Orr*, 319 F.2d 612 (5th Cir. 1963); *First Nat'l Bank v. Champlin Petroleum Co.*, 709 S.W.2d 4 (Tex. Ct. App. 1986). In *Long*, the Fifth Circuit stated:

Conversion is ". . . the unlawful and wrongful exercise of dominion, ownership, or control

bad faith dichotomy used to determine subsurface trespass damages applies in the conversion context as well.¹⁶⁶ The list of potential defendants in a conversion action may exceed that for subsurface trespass, extending beyond those directly involved in the subsurface entrance.¹⁶⁷ The statute of limitations for a conversion action typically begins to run from the time of the conversion, unless there has been a fraudulent concealment.¹⁶⁸

2. Private Nuisance

Another potential cause of action for a subsurface entry is the private nuisance. A private nuisance has been defined as "a substantial and unreasonable interference with the plaintiff's use and enjoyment of his real property."¹⁶⁹ While plaintiffs have often pursued a nuisance cause of

by one person over the property of another, to the exclusion of the same rights by the owner, . . ."

. . . Although the act of control or dominion must be positive and affirmative . . . , a wrongful or fraudulent intent or purpose is not required, and the presence of good faith in the converter is relevant only on the issue of damages.

Long, 340 F.2d at 219-20 (citations and footnotes omitted).

166. *E.g.*, *Harrington*, 339 F.2d at 821 & n.16. *See generally* SUMMERS, *supra* note 26, § 24, at 54-60. For a discussion of the good faith and bad faith measure of damages in the context of subsurface trespass, see *supra* notes 42-49 and accompanying text.

167. *E.g.*, *Long*, 340 F.2d at 221 (permitting victim of directional well subsurface trespass to recover under conversion theory against the financial institution that loaned money to the trespasser and who received mortgage payments directly from the pipeline company. The Fifth Circuit found that, while the financial institution did not physically receive the oil, it did exert sufficient control over the property (i.e., more extensive than mere creditor-debtor relation) so as to be liable for conversion. *Id.*

168. *Long*, 340 F.2d at 213-14 (holding that statute of limitations was tolled only as to the fraudulent concealing subsurface trespasser, not as to the financial institution also liable for conversion); *Orr*, 319 F.2d at 613 (holding that the conversion statute of limitations is tolled where defendant has fraudulently concealed the cause of action but requiring plaintiff to act with reasonable diligence to discover the fraud after being put on inquiry); *First Nat'l Bank*, 709 S.W.2d at 7. *See generally* KUNTZ, *supra* note 41, § 11.10.

169. Reynolds, *supra* note 2, at 228 (comparing trespass and private nuisance law). Professor Reynolds discussed trespass and private nuisance as follows:

Clearly an unauthorized use or other invasion of my neighbor's real property may disturb not only his interest in possession, creating trespass liability, but may also simultaneously disturb his use and enjoyment of that property, causing nuisance liability. Therefore, the torts of trespass and nuisance are not mutually exclusive and may coexist in the same set of facts. . . .

. . . .

The fundamental distinction between trespass and nuisance, underlying such other distinctions as the requirements that a trespass be tangible and visible, is the definitional idea of trespass as an invasion of possessory interests in real property and of nuisance as an invasion of the use and enjoyment of land, with possibly some incidental harm to possessory interests. . . . The one tort damages the property itself; the other damages the possessor's use thereof. Of course, the same conduct may damage both the property and its use.

Reynolds, *supra* note 2, at 229, 234.

action in the context of injected fluids subsurface entries,¹⁷⁰ research yielded no case law in the context of a directional well subsurface entrance, presumably because the directional well subsurface entrance ordinarily would not substantially interfere with the plaintiff's use and enjoyment. In the context of a hydraulic fracture subsurface entrance, a private nuisance action should not ordinarily obtain because the nature of the intrusion is far less likely to interfere with the adjacent owner's use and enjoyment than is the intrusion from saltwater injection or waterflood. Again, the nature of the intrusion in a hydraulic fracture is more like that of a directional drilling well.

3. Negligence

Finally, the victim of a subsurface entry presumably could maintain a cause of action for negligence.¹⁷¹ In fact, the court in *Gifford Operating* expressly held that Gifford and DSI were liable for negligent design and execution of the fracture treatment of the Stanley well, in addition to liability for subsurface trespass.¹⁷² Perhaps the reason that plaintiffs have typically chosen to pursue trespass causes of action instead is to avoid having to establish the unreasonableness of defendants' operations.¹⁷³

IV. CONCLUSION

With the advent of deep-penetrating, hydraulic fracturing operations in the past decade, primarily in tight gas reservoirs, the potential

170. *E.g.*, *Mowrer v. Ashland Oil & Ref. Co.*, 518 F.2d 659 (7th Cir. 1975) (holding that defendant oil company was liable under a private nuisance theory for oil seepage onto plaintiff's land near a capped well caused by defendant's authorized, non-negligent waterflood operation); *Greyhound Leasing & Fin. Corp. v. Joiner City Unit*, 444 F.2d 439 (10th Cir. 1971) (holding that defendant waterflood unit operator was liable for private nuisance damages [fair market differential] arising from the flooding of plaintiff's leases outside of the authorized waterflood); *Boyce v. Dundee Healdton Sand Unit*, 560 P.2d 234 (Okla. Ct. App. 1975); *Gulf Oil Corp. v. Hughes*, 371 P.2d 81 (Okla. 1962) (holding that defendant waterflood operator was liable for private nuisance, even in absence of negligence, where injected salt water invaded fresh water zones on plaintiff's land; the damage formula was the fair market value differential for permanent injury to the fresh water supply, or the cost of a replacement fresh water well for non-permanent injury).

171. In fact, one commentator has suggested that "[i]f an interference with any rights of either possession or use of property is unintentional, negligence is the appropriate theory of recovery, . . . requiring application of a reasonableness standard." Reynolds, *supra* note 2, at 230 (citation omitted).

172. *Gifford Operating Co. v. Indrex, Inc.*, No. 2:89-CV-0189, slip. op. at 11-12 (N.D. Tex. Aug. 7, 1992). For a discussion of *Gifford Operating*, see *supra* notes 149-156 and accompanying text.

173. *Cf.* *Texon Drilling Co. v. Elliff*, 216 S.W.2d 824 (Tex. Civ. App. 1948) (awarding conversion damages for injury to personalty, rather than fair market value differential for injury to realty, where defendant negligently drilled well, resulting in blowout that drained oil and gas from beneath plaintiff's land and eventually cratered wells on plaintiff's land), *on remand from Elliff v. Texon Drilling Co.*, 210 S.W.2d 558 (Tex. 1948).

for an operator to effect a subsurface entry into an adjacent lease is amplified. In the event that a hydraulic fracture subsurface entrance does occur, the aggrieved owner is likely to pursue a cause of action for subsurface trespass, regardless of whether situated in an ownership in place jurisdiction or a nonownership jurisdiction. The measure of damages will likely depend on the good faith (or bad faith) of the trespasser but may be significantly more difficult to prove than in cases for directional well subsurface trespass because of difficulties in proving what, if any, portion of the increased production is attributable to the trespass. Subsurface trespass liability may extend beyond the operator of the trespassing well to service companies actively participating in the hydraulic fracture operation, although little case law exists on the issue. The aggrieved landowner may also seek to enjoin production from the trespassing well. Additionally, the aggrieved owner may pursue a cause of action under the following theories, in order of decreasing preference: (1) conversion; (2) private nuisance; (3) negligence.

