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A 2015 Analysis and Update on U.S. Pore Space Law —The Necessity of Proceeding Cautiously With Respect to the "Stick" Known as Pore Space

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A 2015 ANALYSIS AND UPDATE ON U.S. PORE SPACE LAW — THE NECESSITY OF PROCEEDING CAUTIOUSLY WITH RESPECT TO THE "STICK" KNOWN AS PORE SPACE*

TRAE GRAY**

* I dedicate this to my mom who sacrificed and went without so I could do more. Although it took a while to take, she instilled in me the importance of higher education and hard work, which has been the bedrock for each of my successes. This paper, what I know and have learned, is because of her unconditional love and patience in raising me.

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Science Degree from Oklahoma State University in Agricultural Sciences and Natural Resources where he majored in Agricultural Economics. Thereafter he was an award winning salesperson and sales manager for two Fortune 500 companies, Dell and Pitney Bowes. He attended the night program at Oklahoma City University where he obtained his Juris Doctorate and Masters in Business Administration degrees. In 2006, he founded LandownerFirm.com. In 2011, he was honored as a Top Trial Lawyer in America as a Lifetime Member of the Multi-Million Dollar Advocates Forum. In 2013, he was named to the 40 under 40 by Oklahoma Magazine and Listed in the Top 100 Verdicts by the *National Law Journal*. He maintains a nationwide law practice from his ranch in Coal County, Oklahoma.

It's easy for most of us to recall our first year of law school and possibly even our basic Property Law class where property rights are commonly explained as a "bundle of sticks." Pore space, as one of the many different sticks in the bundle, is generally thought of as a subsurface property right. Although it can be defined in a number of different ways, pore space, by its simplest definition, is the empty space between grains of rock, fractures, and voids.[1] However, when defining pore space as a property right, states have become increasingly more specific. For example, Oklahoma defines pore space as "any interstitial space not occupied by soil or rock, within the solid material of the earth, and any cavity, hole, hollow or void space within the solid material of the earth."[2] Other states, such as Wyoming, are primarily concerned with the use of pore space for carbon sequestration,

1. *Aquifer Definitions*, IDAHO GEOLOGICAL SURV., http://www.idahogeology.org/Services/Hydrogeology/PortneufGroundWaterGuardian/my_aquifer/vocab/vocab.html (last visited May 15, 2015) (definition of "pore space").

2. 60 OKLA. STAT. § 6 B(1) (2011).

and therefore, specifically define pore space as "subsurface space which can be used as storage space for carbon dioxide or other substances."[3]

Until very recently, pore space was hardly considered a property right at all. However, the surge of interest in carbon capture and sequestration (CCS), as well as the need to store salt water produced by the oil and gas industry, as a waste product arising from oil and gas production and from hydraulic fracturing, have made pore space ownership an increasingly popular, yet extremely underdeveloped area of the law. As the law surrounding pore space develops in the coming years, it will become critically important for policymakers, legislators, judges, and lawyers to examine the consequences of decisions regarding pore space. Currently, questions abound when considering pore space as a property right. For instance:

- Does it make sense for pore space to be a private property right?
- Does it make better sense for the government to own pore space?
- Should it be considered as part of the mineral estate?
- Or should it be a right of the surface estate?
- If it is determined that this resource is better owned by the government, is the takings clause implicated?

This paper will serve as an analysis and update on current pore space law in Arkansas, Colorado, Kansas, Kentucky, Montana, New Mexico, North Dakota, Oklahoma, Pennsylvania, Texas, and Wyoming. Further, the paper will discuss certain uses of pore space and why policy and legal decisions surrounding it are important to the development or non-development of pore space as a natural resource.

I. Introduction

To begin, this paper will analyze the certainty or uncertainty of the respective law in Arkansas, Colorado, Kansas, Kentucky, Montana, New Mexico, North Dakota, Oklahoma, Pennsylvania, Texas, and Wyoming as it relates to pore space. These states were chosen because production of oil and gas, enhanced oil and gas recovery, and salt water disposal are prevalent in each state's respective oil and gas plays, including shale oil and shale gas plays. While this is not an exhaustive list of all of the production in the United States, it does encompass a significant majority of the current U.S. oil and gas production. Furthermore, a few of these states have addressed pore space as it directly relates to CCS. In recent years, some

3. WYO. STAT. ANN. § 34-1-152 (2013).

states, such as North Dakota, Montana, Oklahoma, and Wyoming, have enacted specific statutes which make the law on pore space fairly certain. While other states have taken little or no action, which has ultimately left the matter up in the air and created an uncertain legal climate surrounding pore space ownership. With the viability of CCS continually increasing, this will be an important area of law in every state. Due to the widespread use of waste water disposal wells for disposing of byproducts generated from drilling and fracking operations, it is likely that states with heavy oil and gas activity will be at the forefront of making policy in this area. Thus, this paper will concentrate on those states. To conclude, this paper will outline the need for policy that creates legal certainty in this area in the coming years and why that policy is necessary.

II. History of Pore Space Ownership

When determining ownership of pore space, both the surface estate and mineral estate play a significant role. Common law property rights are traceable to an old common law maxim known as the "ad coelum doctrine." This doctrine states "cujus est solum, ejus est usque ad coelum et ad inferos," meaning "to whomever the soil belongs, he owns also to the sky and to the depths."[4] Taken literally, the owner of the surface also holds title to the entire tract from the heavens to the depths of the earth.[5] This theory first made its appearance around 1766, when it appeared in William Blackstone's Commentaries on the Laws of England.[6] Although there are many exceptions, this is the general rule.[7] Both American and English courts have adopted the theory, often using it broadly to define the meaning of land or define the scope of property rights.[8] Ultimately, the theory was referred to so often that it became the so called "American Rule."[9] This form of ownership, although no longer as broad as it was originally[10], is the

4. John G. Sprankling, *Owning the Center of the Earth*, 55 UCLA L. REV. 979, 980 (2008).

5. *Id*.

6. *Id.*

7. Barry Barton. *The Common Law of Subsurface Activity: General Principle and Current Problems, in* THE LAW OF ENERGY UNDERGROUND: UNDERSTANDING NEW DEVELOPMENTS IN SUBSURFACE PRODUCTION, TRANSMISSION, AND STORAGE 21 (Donald N. Zillman et al. eds., 2014).

8. Sprankling, *supra* note 4, at 980.

9. *Id.*

10. Throughout the years, the broad nature of the ad coelum doctrine has been whittled away. For example, with the development of modern aviation, it became insensible to allow a landowner the right to bring a trespass and nuisance claim for airplanes or jets flying above their property despite the notion that ownership extends to the heavens. Similarly, while the

simplest and broadest property interest allowed by law, which is known as a fee simple interest.[11] Determining ownership of pore space is very straightforward when a fee simple interest is involved because the fee owner holds title to both the surface estate and the mineral estate.[12] However, once the fee simple interest is severed into differing estates and burdened with a variety of other property interests, determining pore space ownership can become a confusing and complicated issue.[13]

There are two common ownership structures once the mineral estate has been severed from the surface estate: (1) the non-ownership theory, known as the "English Rule"; and (2) the ownership in place theory, known as the "American Rule."[14] The English Rule is commonly used in the United Kingdom, Canada, and Australia, where mineral rights are mostly owned by the respective governments.[15] The English Rule specifies that the mineral interest owner only holds a right to explore and reduce the minerals to possession prior to capture of the minerals.[16] The English Rule further "maintains that the mineral interest owner has the exclusive right of possession of the whole space and, after all minerals have been extracted, the owner is entitled to the entire and exclusive use of that space for all purposes."[17] Application of the English Rule within the United States would vest pore space ownership with the mineral estate, and although the English Rule is currently the minority rule within the United States, the presence of its application can be seen in several states.[18]

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ad coelum doctrine can easily be applied to minerals in place, such as gold and silver, or even coal; the fugitive nature of oil and gas makes it difficult to apply the ad coelum doctrine. As a result, either the rule of capture or the ownership in place theory has been applied by most U.S. states in regard to oil and gas. *See* Spranking, *supra* note 4, at 1010-11; Colin Cahoon, *Low Altitude Airspace: A Property Rights No-Man's Land*, 56 J. AIR L. & COM. 157 (1990).

11. MARK A. DE FIGUEIREDO, MASS. INST. OF TECH., PROPERTY INTERESTS AND LIABILITY OF GEOLOGIC CARBON DIOXIDE STORAGE: A SPECIAL REPORT TO THE MIT CARBON SEQUESTRATION INITIATIVE 5 (Sept. 2005), *available at* http://sequestration.mit.edu/pdf/deFigueiredo_Property_Interests.pdf.

12. *Id.* at 5-6.

13. *Id.* at 6.

14. ELIZABETH LOKEY ALDRICH ET AL., ENERGY POLICY INST., ANALYSIS OF EXISTING AND POSSIBLE REGIMES FOR CARBON CAPTURE AND SEQUESTRATION: A REVIEW FOR POLICYMAKERS 17-20 (Apr. 2011), *available at* http://epi.boisestate.edu/media/6079/epi%20ccs%20pore%20space%20regimes.pdf.

15. *Id.* at 17-18.

16. *Id.*

17. *Id.*

18. *Id.* at 18.

The American Rule, on the other hand, "involves the severance of a mineral right from the interest in the whole geological formation."[19] When applying the American Rule, the mineral estate owns the minerals beneath the land, but the geological formation, is owned by the surface estate.[20] The American Rule is currently the majority rule in the United States.[21] Of the states that have specifically passed legislation pertaining to pore space ownership, each has specifically vested ownership of the pore space with the surface estate. This emerging trend is based on the recognition that:

> (1) owners of fee-simple estates traditionally have owned everything on, above, or below the surface except to the extent particular rights have been granted to others; (2) historically, fee-simple owners have tended to retain ownership of the surface when carving mineral interests out of the fee for transfer to others; (3) legal instruments transferring a portion of the fee-simple owner's property rights to others have tended to be narrowly drafted; and (4) courts generally interpret such instruments to have transferred only what is specifically mentioned together with whatever other rights are necessarily associated with the rights explicitly identified.[22]

In addition, although the American Rule vests pore space ownership with surface estate, the mineral owner still has the right to explore and remove minerals from the land, which allows a mineral owner the right of reasonable use of pore space for mineral exploration. As a result, in states applying the American Rule, it cannot simply be said that pore space belongs solely to surface estate owner. It must also be determined if the reservoir has been depleted of minerals because until the reservoir has been depleted, the mineral owner still has a right to use the pore space.[23]

Although most of the recent literature involving pore space often involves a discussion of both the English Rule and American Rule, at least one commentator, Barry Barton, has concluded there is no distinction between the two rules at all, and there is only one default position – that the "subsurface is in the same proprietorship as the surface, subject only to

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19. *Id.* at 19.
20. *See id.*
21. *Id.*
22. R. Lee Gresham & Owen L. Anderson, *Legal and Commercial Models for Pore-Space Access and Use for Geologic CO2 Sequestration*, 72 U. PITT. L. REV. 701, 710 (2011).
23. DE FIGUEIREDO, *supra* note 11, at 7.

particular grants of mines and minerals."[24] Barton analyzes the line of English, Scottish, and Canadian cases[25] that is often cited as support for the English Rule (vesting pore space ownership with the mineral estate), but he concludes that, when read closely, these cases do not produce such a result at all.[26] Instead, each of these cases presents a general line of facts that allows it to be distinguished.

> Virtually all the cases concerned coal, or coal and limestone or ironstone. The context of stratified mineral deposits may have lent itself more readily than others to the conclusion that a grant of the stratum was intended. Extrapolation to oil and gas seems unjustified. In addition, the cases are all about the use of the spaces in a conventional mine; extrapolation to microscopic pore spaces also seems unjustified.[27]

Finally, it is pointed out that each decision depended entirely on the interpretation of the instrument of severance.[28] As a result, the commentator concluded that "the cases do not justify any proposition that pore space has a legal status different from any other attribute of subsurface material, or of land ownership generally . . . . 'Pore space' is generally owned and possessed by the land owner, not the mineral owner."[29] Although this argument is very persuasive and notable, for the purposes of this paper, the English Rule will be presented as a rule distinct from the American Rule, because several courts in the United States have made this distinction, albeit that they have done so incorrectly.

Clearly, regardless of whether the English Rule or American Rule is involved, determining ownership of pore space is typically not a simple task. This paper will now examine the evolution of pore space law in several states in order to further explore the complications of determining

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24. Barton, *supra* note 7, at 30.

25. This line of cases examined includes: Bowser v. Maclean, (1860) 45 Eng. Rep. 682 (Ch.); 2 De G. F. & J. 415; Proud v. Bates, (1865) 34 L.J. (Ch.) 406 (Eng.); Duke of Hamilton v. Graham, [1871] L.R. 2 Sc. App. Cas. 166 (H.L.); Ramsay v. Blair, [1876] L.R. 1 App. Cas. 701 (H.L.); Ballacorkish Silver, Lead & Copper Mining Co. v. Harrison, [1873] 5 L.R.P.C. 49 (Eng.); Eardley v. Granville, [1876] 3 L.R.Ch. 826 (Eng.); Batten Pooll v. Kennedy, [1907] 1 Ch. 256 (Eng.); Little v. W. Transfer & Storage Co., [1922] 3 W.W.R. 356 (Can. Alta. C.A.); and Cent. Ky. Natural Gas Co. v. Smallwood, 252 S.W.2d 866 (Ky. 1952), *overruled by* Tex. Am. Energy Corp. v. Citizens Fid. Bank & Trust Co., 736 SW 2d 25 (Ky. 1987).

26. Barton, *supra* note 7, at 30.

27. *Id.* at 33.

28. *Id.* at 34.

29. *Id.*

pore space ownership. This paper will also identify the variations in pore space ownership among the states, which will ultimately reveal a need for policy that creates legal certainty in this legal area in the coming years and why that policy is necessary.

A. Arkansas

1. History

During the 2011 Regular Session of the Arkansas Legislature, House Bill Number 1450 was introduced but not enacted. House Bill Number 1450 specifically addressed the issue of pore space ownership and read as follows:

> 15-72-1106. Ownership of reservoir and pore space.
>
> (a)(1) A conveyance of the surface ownership of real property may be deemed to be a conveyance of the reservoir and pore space in all strata below the surface of the real property, except in the following circumstances:
>
> (A) The ownership interest in the reservoir and pore space has been previously severed from the surface ownership;
>
> (B) The ownership interest in the reservoir and pore space has been explicitly reserved from the conveyance of the surface ownership; or
>
> (C) The ownership interest in the reservoir and pore space has been implicitly reserved from the conveyance of the surface ownership by the placement of a restriction or limitation on the use of the surface estate.
>
> (a)(2) (A) A conveyance of the surface only in an original severance deed may be sufficient to reserve to the grantor the reservoir and pore space.
>
> (B) A conveyance or reservation of coal, oil, gas, coalbed methane, and other minerals may not be sufficient as a conveyance or reservation of the reservoir and pore space.
>
> (b) If, notwithstanding subsection (a) of this section, prior agreements and conveyances remain uncertain as to the ownership of the reservoir and pore space, ownership of the

> reservoir and pore space in the strata below the surface is vested in the owner of the surface above the strata.
>
> (c) This section is not intended to change, impinge upon, or impair any existing rights to store underground, extract, mine or otherwise produce coal, oil, gas, coalbed methane, or other mineral interests, including rights under the Underground Storage of Gas Law, § 15-72-601 et seq., or to prevent any party from asserting adverse possession of the reservoir and pore space.[30]

2. Current Status of Pore Space Ownership in Arkansas

Currently, Arkansas has not addressed pore space ownership either by statute or through case law.

3. The Future of Pore Space Ownership in Arkansas

Although pore space ownership has not yet been specifically addressed, it is likely, based on House Bill 1450, that the Arkansas legislature will soon address pore space ownership and will likely award the right to the surface estate, except where pore space has previously been severed from the surface.

B. Colorado

1. History

Colorado has not specifically addressed pore space ownership, either by statute or through case law. However, in the spring of 2010, the governor of Colorado authorized the Colorado Department of Natural Resources to form a Carbon Capture and Sequestration Task Force (the "Task Force") comprising of legislators, agency officials, and industry and environmental stakeholders to explore geologic sequestration of carbon dioxide.[31] The initial goal of the Task Force was to develop legislation to be introduced in the Colorado General Assembly in 2011.[32] The Task Force focused on three key issues: (1) ownership of subsurface pore space; (2) aggregation of

30. H.R. 1450, 88th Gen. Assemb., Reg. Sess. (Ark. 2011) (defeated), *available at* ftp://www.arkleg.state.ar.us/Bills/2011/Public/HB1450.pdf.

31. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, COLO. MINING ASS'N, http://www.coloradomining.org/Content/Release_Pdf/Report%20from%20the%20Carbon%20Capture%20and%20Geological%20Sequestration%20Task%20Force.pdf (last visited May15, 2015).

32. *Id.*

adequate land for carbon sequestration; and (3) long-term ownership of and liability for permanently sequestered carbon.[33] Ultimately, the Task Force adjourned in November of 2010 without proposing legislation on any of the issues and, in addition, decided to shelve the issue until further notice due to the continued economic weakness within the state and the unlikelihood that the 111th Colorado Congress would pass climate change legislation regarding carbon emissions.[34]

2. Current Status of the Law in Colorado

Although pore space ownership has not yet been specifically addressed, the Task Force, despite failing to issue proposed legislation, offered valuable insight into the current and future status of pore space ownership within Colorado.[35] In an effort to determine pore space ownership, the Task Force convened a panel of experts from a wide range of fields, such as agriculture, oil and gas, real estate, water, and the state and federal government, to address the issues surrounding pore space ownership.[36] Although the Task Force did not make any formal recommendations, the majority of the panel concluded that pore space ownership belonged with the surface estate unless previously severed or expressly conveyed.[37]

This decision was based on the fact that Colorado operates under an ownership in place theory, which states "that a mineral owner has the right to present possession of the oil and gas in place, as well as the right to search for, develop, and produce [the minerals] from the property."[38] This is a present interest right which means that the mineral owner has no interest in the cavity once the minerals are depleted.[39] Due to the ownership-in-place theory, the Task Force found that if the surface and mineral estates had not been severed, then pursuant to common law and the ad coelum doctrine, the fee owner held title to the pore space.[40] However, once the estates are severed, pore space ownership remains with the surface estate based on the notion that property rights not expressly conveyed are

33. *Id.*

34. *Id.*

35. Colorado CCS Task Force, *Briefing Paper for Discussion: Ownership of Pore Space*, COLO. DEP'T OF NAT. RESOURCES, 1 (Apr. 16, 2010), http://dnr.state.co.us/SiteCollectionDocuments/CCS%20DOCS/PoreSpaceOwnership-041610.pdf.

36. *Id.*

37. *Id.*

38. *Id.*

39. *Id.*

40. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

retained.[41] Nevertheless, it must be noted that, by statute, a surface owner cannot "prevent an operator from entering upon and using that amount of the surface as is reasonable and necessary to explore for, develop, and produce oil and gas."[42] It is, therefore, also reasonable to conclude that the owner of the mineral estate has the right to the reasonable use of the surface estate, which extends to the subsurface pore space, in order to harvest the mineral resources.[43] As a result, within Colorado, it is likely that the mineral estate would have a protected interest in the subsurface pore space even if the state statutorily declared that pore space ownership vests with the surface estate, with such interest terminating once the minerals have been depleted.[44] Thus, although the Task Force did not address the issue of a split estate directly, the majority of the Task Force believed that a mineral owner's rights to extract minerals would supersede the use of the pore space for geologic sequestration.[45]

However, despite the agreement by the Task Force that pore space remains with the surface estate where the surface and mineral estates have been severed, there is one particular case in Colorado that arguably could support the application of the English Rule, which would vest ownership of the pore space with the mineral owner. In *Grynberg v. City Northglenn*, the City obtained permission from the severed surface estate owner to gather core samples necessary to determine if the land was suitable for a wastewater reservoir.[46] The plaintiff, an unrecorded lessee of the coal rights, then sued for damages equal to the speculative value of the coal rights after the City of Northglenn disclosed the results, which showed an absence of commercially recoverable coal deposits, in the public records.[47] The Colorado Supreme Court held that the plaintiff, as the coal lessee, had the exclusive right to grant permission to collect core samples from the coal seams, which ultimately prohibited access to the mineral estate by anyone other than the mineral owner.[48] Although the case did not hold that the plaintiff owned the pore spaces in the coal, it is easy to see how the rationale applied in *Grynberg* could easily support the application of the

41. Colorado CCS Task Force, *supra* note 35, at 2.

42. COLO. REV. STAT. § 34-60-127(c) (2014).

43. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

44. *Id*.

45. *Id.*

46. Grynberg v. City of Northglenn, 739 P.2d 230, 231 (Colo. 1993).

47. *Id.*

48. *Id.* at 239.

English Rule in Colorado.[49] However, some commentators have suggested that *Grynberg* was wrongly decided and have stated that "[a] surface owner desirous of intense surface development should have the right to take core samples to determine whether the land is suitable for the intended development," and "[t]he mineral owner should not be allowed to hold the taking of core samples for ransom, which is the practical effect of the decision."[50]

Outside of pore space ownership, the Task Force also considered amalgamation and unitization of subsurface property rights.[51] Carbon sequestration requires a large expanse of land. As a result, potential difficulties are likely to arise when attempting to negotiate agreements among the myriad of property owners, such as surface owners, mineral owners, lessees, and royalty owners, or in the instance of a potential hold-out owner that derails the entire project.[52] Due to these difficulties, among others, it would make sense that some form of condemnation authority would be essential to the development of CCS.[53] For instance, Colorado's Underground Storage Act allows condemnation for natural gas storage after the storage formation is "nonproductive of oil or gas in commercial quantities under either primary or secondary recovery methods."[54] This is similar to the Interstate Oil and Gas Compact Commission's Model Statute for Geologic Storage of Carbon Dioxide, which would grant the operator of a geologic carbon sequestration facility the authority to exercise eminent domain and acquire all surface and subsurface rights necessary for the purpose of operating the storage facility.[55]

Unitization, which is common in the oil and gas industry, provides yet another means by which property can be aggregated for CCS.[56] Unitization occurs when large tracts of land with multiple owners are combined into a

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49. Colorado CCS Task Force, *supra* note 35, at 2.

50. Owen L. Anderson, *Geologic CO2 Sequestration: Who Owns the Pore Space*?, 9 WYO. L. REV. 97, 126-27 (2009).

51. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

52. *Id.*

53. *Id.*

54. COLO. REV. STAT. § 34-64-104 (2014).

55. Colorado CCS Task Force, *supra* note 35; *see also* Interstate Oil & Gas Comm'n Task Force on Carbon Capture & Geologic Storage, Storage of Carbon Dioxide in Geologic Structures: A Legal and Regulatory Guide for States and Provinces (Sept. 25, 2007) [hereinafter IOGCC Guide], *available at* http://digitalprairie.ok.gov/cdm/ref/collection/stgovpub/id/3726.

56. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

single unit to facilitate greater recovery within a particular field.[57] Colorado, like most states, has granted its Oil and Gas Conservation Commission the statutory authority to unitize lands over the objections of hold-outs provided a certain percentage of the interest owners agree.[58] As a result, the Task Force did consider whether to include a unitization provision in the proposed legislation, but, again, reached no consensus.[59] The Task Force did feel that such a provision would be controversial and could possibly cause any legislation regarding pore space to fail.[60] The Task Force did not consider the issue of eminent domain.[61]

The Task Force also considered long-term ownership and liability of injected carbon as a geologic carbon sequestration project is intended to indefinitely contain the injected carbon in the subsurface strata.[62] Due to the infinite nature of a sequestration project, a multitude of questions were raised regarding who owns, maintains, and monitors such a facility and who will be liable for damages in the future.[63] For instance, it is unlikely that a facility operator would willingly accept liability indefinitely which brings about the question of whether assignment of the liability to a state or federal agency is the appropriate solution.[64] The Interstate Oil and Gas Compact Commission's Model Statute for Geologic Storage of Carbon Dioxide provides for transfer of "ownership to the remaining project including the stored carbon dioxide" to the state ten years after cessation of operations.[65] The Task Force discussed the issues surrounding long-term monitoring and liability issues, but, again, did not reach a consensus.[66] The Task Force did, however, state that most states would not be willing to take on long term liability.[67] As a result, some members of the Task Force suggested transferring liability to the federal government as the federal government

57. Colorado CCS Task Force, *supra* note 35 at 3-4.

58. *Id.*

59. *Id.*

60. *Id.*

61. *Id.*

62. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

63. *Id.*

64. *Id.*

65. *Id.*; *see also* IOGCC Guide, *supra* note 55, at 35 (appendix I, "Model Statute for Geologic Storage of Carbon Dioxide").

66. *Report from the Colorado Carbon Capture and Geological Sequestration Task Force*, *supra* note 31.

67. *Id.*

would have the means to establish a uniform national monitoring, management, and regulatory system.[68]

Although the Task Force did not reach any formal conclusions and did not propose any legislation, the Task Force did offer valuable insight into the future of pore space ownership in Colorado. Clearly the first step for Colorado will be to determine ownership of pore space and then, as the Task Force recognized, a legislative scheme will likely be developed that will address eminent domain and long-term storage and liability issues.

3. The Future of Pore Space Ownership in Colorado

Although the Task Force concluded there was no immediate need for legislation regarding carbon dioxide sequestration and intentionally delayed the passage of such legislation, pore space ownership will likely need to be examined again in the near future in Colorado as it is unlikely that relying on the common law or case law to determine ownership will be possible for much longer.[69] For instance, although the members of the Task Force agreed that where ownership of pore space had not been expressly conveyed, ownership belonged to the surface owner, the members expressed concerns regarding whether the mineral estate would remain dominant to storage of CO_2.[70] As previously mentioned, most members felt that CO_2 sequestration should remain servient to the mineral estate.[71] Further, an interesting issue was raised by the Task Force: even if ownership of the pore space remains with the surface estate under the common law, the surface owner's ability to allow sequestration may be limited due to residual amounts of mineral resources left behind simply because they were not economically viable to extract.[72] If new technologies provide for economic extraction in the future, the mineral estate will remain dominant, even after the extraction of the majority of the minerals, which will ultimately hinder CO_2 sequestration.[73] In addition, there was no general consensus reached by the Task Force regarding long term liability of the CO2 or whether unitization would be allowed in instances where there are multiple pore space owners.[74]

Due to the numerous uncertainties surrounding pore space ownership, it is difficult to determine the future of pore space ownership in Colorado.

68. *Id*.
69. *Id*.
70. *Id*.
71. *Id*.
72. *Id*.
73. *Id*.
74. *Id*.

However, considering that Colorado operates under an ownership-in-place theory, it is likely that any legislation enacted will result in pore space ownership remaining with the surface estate. Nevertheless, there is a slim possibility the Colorado legislature will apply *Grynberg* and allocate pore space to the mineral owner, especially if there is a strong consensus that the mineral estate can never be entirely depleted.

C. Kansas

1. History

During the 2011 Regular Session of the Kansas Legislature, House Bill Number 2164 was introduced by the Committee on Energy and Utilities. Although it was defeated prior to enactment, House Bill Number 2164 specifically addressed the issue of pore space ownership and read as follows:

AN ACT concerning property; relating to ownership of pore space.

Be it enacted by the Legislature of the State of Kansas:

> Section 1. (a) As used in this act, "pore space" means a cavity or void, whether natural or artificially created, in a subsurface sedimentary stratum.
>
> (b) Title to pore space in all strata underlying the surface of lands and waters is vested in the owner of the mineral rights or interest. A conveyance of title to the mineral rights or interest conveys the pore space in all strata underlying the surface of the real property. Title to pore space may not be severed from title to the mineral rights or interest. Any instrument or arrangement that seeks to sever title to pore space from title to the mineral rights or interest is void. Leasing pore space is not a severance prohibited by this act.
>
> (c) This act does not affect transactions before the effective date of this act that severed pore space from title to the surface estate.
>
> Sec. 2. The provisions of this act are declared to be severable and if any provision, word, phrase or clause of the act or the application thereof to any person shall be held invalid, such invalidity shall not affect the validity of the remaining portions of this act.

> Sec. 3. This act shall take effect and be in force from and after its publication in the statute book.[75]

Thereafter, in 2012, Senate Bill 271 was introduced, which was also defeated, but also specifically addressed the issue of pore space ownership and read as follows:

> AN ACT concerning property; relating to ownership of pore space.
>
> *Be it enacted by the Legislature of the State of Kansas:*
>
> Section 1. (a) The ownership of all pore space in all strata below the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata.
>
> (b) A conveyance of the surface ownership of real property shall be a conveyance of the pore space in all strata below the surface of such real property unless the ownership interest in such pore space previously has been severed from the surface ownership or is explicitly excluded in the conveyance. The ownership of pore space in strata may be conveyed in the manner provided by law for the transfer of mineral interests in real property. No agreement conveying mineral or other interests underlying the surface shall act to convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest.
>
> (c) No provision of law, including a lawfully adopted rule or regulation, requiring notice to be given to a surface owner, to an owner of the mineral interest, or to both, shall be construed to require notice to persons holding ownership interest in any pore space in the underlying strata unless the law specifies notice to such persons is required.
>
> (d) Nothing in this section shall be construed to change or alter the common law as of the effective date of this act, as it relates to the rights belonging to, or the dominance of, the mineral estate. For the purpose of determining the priority of subsurface uses between a severed mineral estate and pore space, the severed mineral estate is dominant regardless of whether

75. H.R. 2164, 2011 Reg. Sess. (Kan.) (defeated), *available at* http://legiscan.com/KS/text/HB2164/2011.

> ownership of the pore space is vested in the several owners of the surface or is owned separately from the surface.
>
> (e) All instruments which transfer the rights to pore space under this section shall describe the scope of any right to use the surface estate. The owner of any pore space right shall have no right to use the surface estate beyond that set out in a properly recorded instrument.
>
> (f) Transfers of pore space rights made after the effective date of this act are null and void at the option of the owner of the surface estate if the transfer instrument does not contain a specific description of the location of the pore space being transferred. The description may include, but is not limited to, a subsurface geologic or seismic survey or a metes and bounds description of the surface lying over the transferred pore space. In the event a description of the surface is used, the transfer shall be deemed to include pore space at all depths underlying the described surface area unless specifically excluded. The validity of pore space rights under this subsection shall not affect the respective liabilities of any party and such liabilities shall operate in the same manner as if the pore space transfer were valid.
>
> (g) Nothing in this section shall alter, amend, diminish or invalidate rights to the use of subsurface pore space that were acquired by contract or lease prior to the effective date of this act.
>
> Sec. 2. This act shall take effect and be in force from and after its publication in the statute book.[76]

2. Current Status of the Law in Kansas

Although Kansas has not specifically addressed the issue of pore space ownership by statute, some commentators have cited to *Mound City Brick & Gas Co. v. Goodspeed Gas & Oil Co.* as case law supporting the conveyance of pore space rights to the mineral estate.[77] In *Mound City* the issue presented to the court was whether the failure of appellant to record a

76. S. 271, 2012 Reg. Sess. (Kan.) (defeated), *available at* http://www.kslegislature.org/li_2012/b2011_12/measures/sb271/.

77. Delissa Hayano, *Guarding the Viability of Coal & Coal-Fired Power Plants: A Road Map for Wyoming's Cradle to Grave Regulation of Geologic CO2 Sequestration*, 9 WYO. L. REV. 139 (2009).

lease within ninety days of its execution and to list the property for taxation purposes rendered the lease null and void.[78] However, the court stated:

> It has also been determined that, although oil and gas in place are a part of the realty, the stratum in which they are found is capable of severance, and by an appropriate writing the owner of the land may transfer the stratum containing oil and gas to another.[79]

Here, due to the fact that the court found that the entire stratum could be severed and not just the minerals; it is believed that the pore space would also be conveyed with the mineral estate instead of remaining with the surface estate. However, it is important to note that *Mound City* was decided in 1910, long before CCS became a possibility or pore space ownership became a heated topic of debate.

3. The Future of Pore Space Ownership in Kansas

It is likely that the oil and gas industry was behind the attempted enactment of the proposed 2011 statute as it clearly favored the mineral owner and was drafted by the Committee on Energy and Utilities. The statute attempted to prevent the severance of pore space from the mineral estate and also attempted to put a mechanism in place whereby a transfer of the mineral estate would also be a transfer of the pore space. However, the statute did provide that pore space could be leased from the mineral estate owner. The implication of this framework would make directional drilling possible without the necessity of sub-surface easements. Arguably, it would also make the disposal of wastewater easier as it would be simpler to negotiate with a mineral estate owner who held the rights to the pore space as opposed to negotiating with a surface owner holding the rights to the pore space. However, as will be further discussed in greater detail, the enactment of this statute might have implemented the Takings Clause of the 5th Amendment to United States Constitution and it is also quite possible the statute would have been stricken for being unconstitutional.

The proposed 2012 statute appears to be a reaction to the proposed 2011 statute. The proposed 2012 statute, in many ways, turns the proposed 2011 statute upside down. For instance, it clearly makes pore space a right of the surface owner as it is clear that a conveyance of the surface estate is also a conveyance of the pore space. Finally, the proposed 2012 statute has very specific and stringent requirements that must be followed if the pore space

78. Mound City Brick & Gas Co. v. Goodspeed Gas & Oil Co., 109 P. 1002,1003 (Kan. 1910).

79. *Id*. at 1004.

is severed. The 2012 proposal is more in line with the existing laws in other states and it more clearly follows historical legal principles. The proposed 2012 statute would most likely be constitutional if enacted.

Despite the dicta found in *Mounds City* suggesting that the entire strata is owned by the mineral estate, it is highly likely, that Kansas would follow the majority rule within the United States and convey pore space ownership to the surface estate and not the mineral estate, provided the decision is based more on principles of existing jurisprudence than political pressure.

D. Kentucky

1. History

In the past century, Kentucky courts have only heard a few cases involving disputes over subsurface property rights.[80] However, there are two Kentucky cases that suggest that pore space ownership may vest with the mineral estate.[81] The most notable case is the current benchmark for the application of the English Rule within the United States.[82] In *Central Kentucky Natural Gas Co. v. Smallwood*, the court held that "the mineral rather than the surface owner [was] entitled to the rental or royalty accruing under a gas storage lease."[83] In *Smallwood*, the plaintiff was the surface owner and also the owner of a one-half interest in the mineral estate.[84] The plaintiff granted a lease for subterranean gas storage to the defendant, a gas company.[85] The defendant, however, only paid the plaintiff one-half of the rent as the plaintiff only owned a one-half interest in the mineral estate.[86] As a result, the plaintiff sought to recover the full rent based on his standing as the surface owner.[87] The court, citing what it believed to be the English Rule and without deciding ownership of the pore space, found that the mineral owner had a continuing right to use the strata to produce naturally occurring or stored gas.[88] The court based its decision on the understanding that fugitive minerals, like oil and gas, were not stationary and that no one owned fugitive minerals until captured. As a result of this reasoning, the

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80. Mark A. Imbrogno, Note, *Pipedream to Pipeline: Ownership of Kentucky's Subterranean Pore Space for Use in Carbon Capture and Sequestration*, 49 U. LOUISVILLE L. REV. 291, 294 (2010).

81. Anderson, *supra* note 50, at 129.

82. Inbrogno, *supra* note 80, at 295-97.

83. Cent. Ky. Natural Gas Co. v. Smallwood, 252 S.W.2d 866, 868 (Ky. 1952).

84. *Id.* at 866-67.

85. *Id.*

86. *Id.*

87. *Id*.

88. *Id.*

court found that "allowing the surface-estate to retain such space would violate the mineral-estate's rights by interfering with the use of the space."[89] However, when examining the holding in *Smallwood*, one must also consider *Hammonds v. Central Kentucky Natural Gas Co.* in which the court stated:

> We are of opinion, therefore, that if in fact the gas turned loose in the earth wandered into the plaintiff's land, the defendant is not liable to her for the value of the use of her property, for the company ceased to be the exclusive owner of the whole of the gas-it again became mineral ferae naturae.[90]

Thus, the court explicitly held that the injection and storage of natural gas was a return of the natural gas to nature, therefore making it subject to the rule of capture once again.[91] Under the reasoning of *Hammonds*, the mineral owner would have the right to produce injected gas, but not necessarily the right to inject natural gas.[92]

However, *Texas American Energy Corp. v. Citizens Fidelity Bank & Trust Co.* limited *Smallwood* and *Hammonds*. In *Texas American Energy Corp*., the court stated:

> It is therefore the opinion of this court that, in those instances when previously extracted oil or gas is subsequently stored in underground reservoirs capable of being defined with certainty and the integrity of said reservoirs is capable of being maintained, title to such oil or gas is not lost and said minerals do not become subject to the rights of owners of surface above the storage fields.[93]

The court reasoned that because these minerals were still subject to ownership after injection that they could no longer be considered fugitive.[94] In addition, because this line of reasoning was at odds with the non-ownership theory in *Smallwood*, the court specifically stated it was overruling any contrary statements.[95] To date, *Texas American Energy*

89. Inbrogno, *supra* note 80, at 295-97.
90. Hammonds v. Central Kentucky Natural Gas Co., 75 S.W.2d 204, 206 (Ky. 1934).
91. *Id.*
92. Anderson, *supra* note 50, at 129.
93. Tex. Am. Energy Corp. v. Citizens Fid. Bank & Trust Co., 736 S.W.2d 25, 28 (Ky. 1987).
94. *Id.*
95. *Id.*

Corp. was the last Kentucky case to examine *Smallwood* and only slightly modified the *Smallwood* holding.

2. Current Status of the Law in Kentucky

Currently, Kentucky is the only state with case law that strongly implies that the ownership of the pore space would vest with the mineral estate.[96] In other words, since no other state has expressed an interest in following the minority rule or English Rule, Kentucky is the only state currently following the minority rule.[97]

3. Future of Pore Space Ownership in Kentucky

Due to the fact that *Smallwood* has not been examined since *Texas American Energy Corp.*, and because *Texas American Energy Corp.* only slightly modified *Smallwood*, commentators now suggest that both cases are nothing "more than outdated anomalies" for two reasons: (1) there are other Kentucky cases involving disputes between the surface and mineral estates that indicate that pore space is owned by the surface estate; and (2) Kentucky's view is contrary the rest of the United States and is not likely to gain any favor in the future.[98]

While the other Kentucky cases involving disputes between the surface and mineral estates do not squarely address pore space ownership, the cases discuss a variety of subsurface space uses and ownership of the substances contained within the spaces.[99] These cases explore everything from passageways left as a result of coal excavation to natural gas issues arising from production of coalbed methane plays; however, the cases share a common thread in that they all support vesting ownership of pore space with the surface estate.[100]

For instance, in 1933, in *Middleton v. Harlan-Wallins Coal Corp.*, a dispute was presented to the court in which the plaintiff, as surface owner, sought to enjoin the defendant, a coal company and the mineral owner, from using the passageways created as a result of coal excavation to transport coal from adjoining tracts to the surface.[101] The court considered three different scenarios when trying to determine ownership of the passageways: (1) a mineral owner not only owned the minerals, but also the soil where the minerals were embodied; (2) a mineral owner had the right to

96. Inbrogno, *supra* note 80, at 295.
97. *Id.*
98. *Id.* at 298.
99. *Id.* at 299.
100. *Id.*
101. Middleton v. Harlan-Wallins Coal Corp., 66 S.W.2d 30 (Ky. 1933).

use the passageways as long as any mineral remained; and (3) when a surface owner conveyed a mineral interest, the entire stratum was conveyed, resulting in the mineral estate having control over all subsurface pore space.[102] Ultimately, the court found that a mineral owner had the right to use the passageways as long as the minerals remained. The court also found that the surface owner would not be burdened by such use as it did not interfere with the surface ownership.[103]

In addition to *Middleton*, Kentucky, by statute, has granted public utilities the right to take subterranean reservoirs for natural gas and oil storage.[104] However, the statute does not address whether the surface estate or the mineral estate is entitled to compensation when the taking occurs.[105] As a result, Kentucky courts have considered several cases addressing issues related to subterranean reservoirs for natural gas storage.[106] In *Cornwell v. Central Kentucky Natural Gas Co.*, the court addressed the constitutionality of the statute allowing public utilities to take subterranean reservoirs.[107] The court found that the right to drill for oil and gas remained with the landowner and that the gas company was only allowed to store gas in a particular stratum. In reaching its decision, the court considered the mineral interest as separate from the right to store natural gas, which supports the conclusion that the court looked to the surface estate as the pore space owner and not the mineral estate.[108]

In *Milby v. Louisville Gas & Electric Co.*, the court considered the proper compensation for a taking of a subterranean reservoir and in doing so, failed to consider the mineral estate.[109] As a result, it is safe to conclude that the surface estate was the proper estate to compensate. As a result of the *Middleton* holding, which is much more restrictive than *Smallwood* and limits the use of the pore space to mineral extraction, and the preceding cases addressing natural gas storage rights, it is believed by some commentators that pore space ownership in Kentucky should and will vest with surface estate in the near future.[110]

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102. *Id.* at 31.
103. *Id.*
104. Inbrogno, *supra* note 80, at 300-01.
105. *Id.*; KY. REV. STAT. ANN. § 278.502 (LexisNexis 2012).
106. Inbrogno, *supra* note 80, at 300-01.
107. Cornwell v. Cent. Ky. Natural Gas Co., 249 S.W.2d 531 (Ky. 1952).
108. *Id.* at 533.
109. Milby v. Louisville Gas & Elec. Co., 375 S.W.2d 237 (Ky. 1963).
110. Inbrogno, *supra* note 80, at 293.

E. Montana

In 2009, pursuant to Senate Bill 498, Montana specifically addressed the issue of pore space ownership and found that the surface estate is the presumed owner of pore space in the event that ownership cannot be determined from prior deeds or severance documents. Montana's statute on pore space ownership reads as follows:

> 82-11-180. Preservation of property rights. (1) Title 82, chapter 11, parts 1 and 2, and the issuance of a permit for a carbon dioxide injection well pursuant to Title 82, chapter 11, parts 1 and 2, do not:
>
> (a) prejudice the rights of property owners within a geologic storage reservoir to exercise rights that have not been committed to a storage reservoir; or
>
> (b) prevent a mineral owner or mineral lessee from drilling through or near a storage reservoir to explore for and develop minerals, provided that the drilling, production, and related activities comply with board requirements that preserve the storage reservoir's integrity and implement Title 82, chapter 11, parts 1 and 2.
>
> (2) Title 82, chapter 11, parts 1 and 2, may not be construed to:
>
> (a) change or alter common law in accordance with 1-1-108 as it relates to the rights belonging to or the dominance of the mineral estate, including but not limited to the right to mine, drill, or recomplete a well, to inject substances to facilitate production, or to implement enhanced recovery for the purposes of recovery of oil, gas, or other minerals;
>
> (b) impede or impair the ability of an oil and gas operator to inject carbon dioxide for enhanced recovery or to establish, verify, register, and sell emission reduction credits or attributes associated with the project;
>
> (c) change or alter common law or statutory provisions regarding the ownership of surface or subsurface rights;
>
> (d) diminish, impair, or in any way affect the rights of a natural gas public utility, as defined in 82-10-301, to own, operate, or control a gas storage reservoir in use prior to May 6, 2009; or

> (e) apply within the exterior boundaries of any federally recognized Indian reservation within the state of Montana unless the governing body of the tribe adopts a carbon sequestration law and enters into a cooperative agreement with the state.
>
> (3) If the ownership of the geologic storage reservoir cannot be determined from the deeds or severance documents related to the property by reviewing statutory or common law, it is presumed that the surface owner owns the geologic storage reservoir.[111]

While the Montana statute is a bit cumbersome it clearly provides a method outlining how the other property rights or "sticks" interact with the pore space. It defines the right of the operator to reasonable occupation of the pore space for exploration of the dominant estate. The statute even goes as far to address the rights of indigenous tribes. In addition, it clarifies existing rights where pore space is already being used for natural gas storage. As a result, Montana's statute is a prime example of a well-crafted statute addressing the relationship between pore space and other property rights.

F. New Mexico

1. History

The current status of pore space ownership in New Mexico is still undetermined at this time.[112] Furthermore, New Mexico courts have yet to directly address the theories of pore space ownership.[113] However, there are a few cases within New Mexico addressing storage of natural gas in the subsurface.[114] Although the law in this area is also less than fully developed, mainly due to the fact that storage of natural gas in the subsurface is not a common practice in the New Mexico, the case law is applicable to pore space ownership and sheds some light on the issues surrounding such ownership.[115] For instance, in *Jones-Noland Drilling Co. v. Bixby*, the court held that the mineral estate is a limited estate that includes the right to explore for, develop, and remove oil and gas, but does

111. MONT. CODE ANN. § 82-11-180 (2013).

112. MARK. E. FESMIRE ET AL., N.M. ENERGY, MINERALS, NATURAL RESOURCES DEP'T, A BLUEPRINT FOR THE REGULATION OF GEOLOGIC SEQUESTRATION OF CARBON DIOXIDE IN NEW MEXICO 15 (Dec. 1, 2007), *available at* http://www.emnrd.state.nm.us/OCD/documents/CarbonSequestrationFINALREPORT1212007_000.pdf.

113. *Id.*

114. *Id.* at 22.

115. *Id.*

not include the rights to the geologic formation.[116] The court specifically stated that a mineral interest:

> . . . does not convey a greater interest in the soil, except the oil and gas, than to enable the owner of the lease to use the soil in carrying out and availing the leases of the above-named rights . . . [t]he lessee is not the owner of the solids of the earth . . . and merely has the right to use the solid portion so far as necessary to bore for, discover, and bring to the surface oil and gas.[117]

Based on this holding alone, there is a strong implication that pore space ownership resides with the surface estate and not the mineral estate in New Mexico.

Although there is no other case directly on point with the holding in *Jones-Noland Drilling Co.*, there is one other case involving subsurface trespass that also implies that pore space ownership resides with the surface estate.[118] In *Snyder Ranches, Inc. v. Oil Conservation Commission of New Mexico*, the plaintiff brought an action against the Oil Conservation Commission of New Mexico for granting Mobil the authority to inject salt water through a disposal well into an underground formation adjacent to the plaintiffs' property.[119] Although the plaintiff was unable to prove that the saltwater would migrate and result in a trespass, the court, in dicta, found that had the plaintiff been able to prove the migration of the salt water, Mobil could be held liable for a subsurface trespass even though the injection was approved by the Oil Conservation Commission.[120] This holding lends itself to the notion that subsurface pore space is strictly a surface interest by acknowledging an action for subsurface trespass is available to surface owners.[121]

In addition to the proceeding cases, in 2006, the Governor issued Executive Order 2006-69 requiring the New Mexico Energy, Minerals, and Natural Resources Department (herein "EMNRD") to explore and identify statutory and regulatory requirements needed to geologically sequester carbon dioxide.[122] The 2007 report, A Blueprint for the Regulation of Geologic Sequestration of Carbon Dioxide in New Mexico (herein

116. Jones-Noland Drilling Co. v. Bixby, 282 P. 382 (N.M. 1929).

117. *Id.* at 383.

118. Fesmire et al., *supra* note 112, at 23.

119. Snyder Ranches, Inc. v. Oil Conservation Comm'n of N.M., 798 P.2d 587, 588 (N.M. 1990).

120. *Id.* at 590.

121. Fesmire et al., *supra* note 112, at 23.

122. *Id.* at 4.

"Report"), was meant to: (1) identify issues that needed to be addressed through statutory and/or regulatory changes in order fully develop a regulatory framework for the safe and effective sequestration of carbon dioxide; (2) identify questions, concerns, and recommendations; (3) present findings and research to date for policy development; and (4) present an outline of proposed statutes and regulations.[123] In order to accomplish these goals, the EMNRD's Oil Conservation Division (herein "OCD") held a series of public stakeholder meetings with representatives from community and non-governmental organizations, oil and gas exploration and production companies, power generation companies, and industry groups in an effort to gain input on proposed statutory and regulatory framework for CO_2 sequestration.[124] As a result of these meetings, the Report identified and explored a number of statutory issues, such as: (1) authority to regulate carbon sequestration; (2) ownership of Geologic Formation/Pore Space; (3) unitization of recoverable hydrocarbons; (4) condemnation of pore space by eminent domain; authority to transfer liability/ownership to the state, impose sequestration fees, and enter land for inspection; and (5) protection of surface owner's interest.[125] The Report also identified and explored regulatory issues such as siting, permitting, drilling, operations, and closure.[126] When considering ownership of the geologic formation/pore space, the Report stated that:

> Ownership of the pore space must be identified and made clear so that the appropriate interests can be remunerated for the right to sequester, or so condemnation proceedings can properly advance and the proper parties compensated before any commercial-scale sequestration can begin.[127]

The Report concluded that New Mexico case law does not address the question of storage rights directly, but does hold that the mineral interest does not include the solids of the earth.[128] As a result, the Report concluded that "[p]ore space evacuated by the extraction of oil and gas minerals likely belongs not to the mineral interest but to the surface owner . . . ."[129]

Thereafter, a few years after the publication of the report, Senate Bill 208, which specifically addressed the issue of pore space ownership, was

123. *Id*. at 12.
124. *Id*.
125. *Id*. at 2-3.
126. *Id*. at 3.
127. *Id*. at 4.
128. *Id*. at 6.
129. *Id*.

introduced during the 2009 Regular Session of the New Mexico Legislature. However, Senate Bill 208 was defeated. It read as follows:

> [NEW MATERIAL] OWNERSHIP OF PORE SPACE UNDERLYING SURFACES.–
>
> A. The ownership of all pore space in all strata below the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata.
>
> B. A conveyance of the surface ownership of real property shall be a conveyance of the pore space in all strata below the surface of the real property unless the ownership interest in the pore space was previously severed from the surface ownership or is explicitly excluded in the conveyance. The ownership of pore space in strata may be conveyed in the manner provided by law for the transfer of mineral interests in real property. An agreement conveying mineral or other interests underlying the surface shall not act to convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest.
>
> C. No provision of law, including a lawfully adopted rule or regulation requiring notice to be given to a surface owner, to an owner of the mineral interest or to both, shall be construed to require notice to persons holding ownership interest in any pore space in the underlying strata unless the law specifies that notice to such persons is required.
>
> D. Nothing in this section shall be construed to change or alter the common law as of July 1, 2009 as it relates to the rights belonging to, or the dominance of, the mineral estate.
>
> E. All instruments that transfer the rights to pore space under this section shall describe the scope of any right to use the surface estate. The owner of any pore space right shall have no right to use the surface estate beyond that set out in a properly recorded instrument.
>
> F. Transfers of pore space rights made after July 1, 2009 are null and void at the option of the owner of the surface estate if the transfer instrument does not contain a specific description of the location of the pore space being transferred. The description may include a subsurface geologic or seismic survey or a metes and bounds description of the surface lying over the transferred

> pore space. In the event a description of the surface is used, the transfer shall be deemed to include pore space at all depths underlying the described surface area unless specifically excluded. The validity of pore space rights pursuant to this section shall not affect the respective liabilities of any party, and such liabilities shall operate in the same manner as if the pore space transfer were valid.
>
> G. Nothing in this section shall alter, amend, diminish or invalidate rights to the use of subsurface pore space that were acquired by contract or lease prior to July 1, 2009.
>
> H. This section shall not alter the law of New Mexico regarding the primacy of the mineral estate, and any easement created hereunder shall not limit the right of a mineral owner or a mineral owner's lessee to reasonable use of the surface for the purpose of mineral exploration and production unless the owners and lessees of the entire mineral estate and geologic sequestration right are a party to the conservation easement or consent to the conservation easement.
>
> I. All conveyances of interests in real property on and after July 1, 2009 shall be subject to the provisions of this section. All conveyances of real property made prior to July 1, 2009 shall be construed in accordance with the provisions of this section unless a person claiming an ownership interest contrary to the provisions of this section establishes such ownership by a preponderance of the evidence in an action to establish ownership of such interest.
>
> J. As used in this section, the term "pore space" means subsurface space that can be used as storage space for carbon dioxide or other substances.[130]

As predicted by the existing case law and the 2007 Report, the proposed statute granted ownership of the pore space to the surface estate, unless the ownership interest in the pore space was previously severed or explicitly excluded in the conveyance.

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130. S. 208, 49th Leg., 1st Sess. (N.M. 2009), *available at* http://www.nmlegis.gov/Sessions/09%20Regular/bills/senate/SB0208.html.

2. Current Status of the Law in New Mexico

Presently and as previously mentioned, the current status of pore space ownership in New Mexico is undetermined at this time and New Mexico courts have yet to directly address the theories of pore space ownership.

3. Future of Pore Space Ownership in New Mexico

When considering the 2007 Report, the cases previously discussed, and the preceding proposed statute, it becomes clear that New Mexico will likely find that the mineral estate holds only the oil and gas native to the formation, and does not include the rights to the formation or the pore space, unless the pore space has been previously conveyed or severed with the mineral estate.[131] As a result, the surface estate will retain the rights to the pore space and/or geologic formation; however, perhaps the surface estate will only have full rights to the pore space after the minerals have been removed or depleted.[132]

G. North Dakota

In 2009, pursuant to Senate Bill 2139,[133] North Dakota specifically addressed the issue of pore space ownership:

> 47-31-01. Policy. Undivided estates in land and clarity in land titles reduce litigation, enhance comprehensive management, and promote the security and stability useful for economic development, environmental protection and government operations.
>
> 47-31-02. Pore space defined. In this chapter "pore space" means a cavity or void, whether natural or artificially created, in a subsurface sedimentary stratum.
>
> 47-31-03. Title to pore space. Title to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate.
>
> 47-31-04. Conveyance of real property conveys pore space. A conveyance of title to the surface of real property conveys the pore space in all strata underlying the surface of the real property.

131. Fesmire et al., *supra* note 112, at 6.

132. *Id.*

133. S. 2139, 61st Leg. Assemb. (N.D. 2009), *available at* http://www.legis.nd.gov/assembly/61-2009/bill-text/JQTB0100.pdf.

> 47-31-05. Severing pore space prohibited. Title to pore space may not be severed from title to the surface of real property overlying the pore space. An instrument or arrangement that seeks to sever title to pore space from title to the surface is void as to the severance of the pore space from the surface interest.
>
> 47-31-06. Transactions allowed. Leasing pore space is not a severance prohibited by this chapter.
>
> 47-31-07. Application. This chapter does not affect transactions before April 9, 2009, that severed pore space from title to the surface estate.
>
> 47-31-08. Mineral and pore space estates – Relationship. In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belong to, or the dominance of, the mineral estate.[134]

North Dakota, pursuant to Senate Bill 2095, also specifically addressed underground storage of carbon dioxide.

> 38-22-10. Amalgamating property interests. If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage.[135]

North Dakota's statutes fall right in line with the reasoning of the American Rule and are consistent with the other states that have made it clear that pore space is a right owned by the surface owner unless the surface owner decides to sever that right.

A recent North Dakota case provides some guidance with respect to the surface estate's ownership in the pore space. The case provides some clarity on the reasonable use doctrine, unit rights, and their respective relationship to pore space. In *Fisher v. Continental Resources, Inc.*, the District Court of North Dakota held that Continental, as a result of the Unit Agreement covering 50,000 surface acres, had the right to drill a saltwater disposal well within the unit to dispose of saltwater produced within the unit as it was

134. Subsurface Pore Space Policy, N.D. CENT. CODE §§ 47-31-01 to 47-31-08 (2014).

135. Carbon Dioxide Underground Storage, N.D. CENT. CODE § 38-22-10 (2014); *see also* S. 2095, 61st Leg. Assemb. (N.D. 2009), *available at* http://www.legis.nd.gov/assembly/61-2009/bill-text/JQTA0100.pdf.

reasonably associated with exploration and recovery efforts.[136] The court stated, "as long as Continental Resources acts in a reasonable manner and does not use the Lonesome Dove 42–17 SWD well to dispose of salt water produced outside of the Unit, its actions are not considered unlawful."[137] Here, the court hints that if material from outside the unit were disposed of through this disposal well or its accompanying pipeline that the court would consider those actions an invasion into both the surface estate and the pore space which would ultimately be a trespass constituting a nuisance.[138]

H. Oklahoma

1. History

The issue of pore space ownership became an issue of contention in 1999 when more than 100 condemnation suits were filed in the District Court of Beckham County.[139] The interest to be condemned was the right to store natural gas.[140] Natural gas, unlike oil, is more easily stored by re-injection into underground rock pore spaces, which are typically geological formations or common sources of supply whose pore spaces formerly held producible hydrocarbons that are now substantially depleted.[141] The law of underground storage rights is largely undeveloped in Oklahoma and throughout the rest of the United States despite the fact that depleted geological formations have been used for the storage of natural gas since around 1915.[142]

There are several cases in Oklahoma that address the issue of underground natural gas storage rights and to some extent, ownership of pore space. One of the most influential decisions regarding storage rights was handed down by United States Tenth Circuit for the United States Court of Appeals in *Ellis v. Arkansas Louisiana Gas Company*.[143] *Ellis* involved surface owners who challenged the defendant gas producer's use of an underground stratum for the storage of natural gas.[144] Plaintiffs, who owned the surface rights for 78 acres located in Pontotoc County,

136. Fisher v. Cont'l Res., Inc., No. 1:13-CV-097, 2014 WL 4410206, *9 (D.N.D. Sept. 8, 2014).

137. *Id*.

138. *Id*.

139. Eric R. King, The Ownership of Empty Spaces 2 (n.d.) (paper delivered at the Eugene Kuntz Conference on Natural Resources Law & Policy, Nov. 2003).

140. *Id.*

141. *Id.*

142. *Id.*

143. King, *supra* note 139, at 12.

144. Ellis v. Ark. La. Gas Co., 609 F.2d 436 (10th Cir. 1979).

Oklahoma, claimed that the mineral owner was unlawfully utilizing the underground strata for storage of natural gas.[145] Plaintiffs further argued that once the minerals had been depleted from the porous reservoir rock the surface estate became the owner of the reservoir rock and that the mineral owner could not store natural gas without authorization of the surface owner.[146] The mineral owner, however, argued that ownership of the reservoir rock did not grant the surface owner the right to inject and store natural gas and claimed the right to inject and store natural gas by virtue of oil and gas leases, gas storage leases, and gas injection easements.[147]

The *Ellis* court held that a natural gas storage company must obtain permission from the surface owner in order to store natural gas produced elsewhere and reasoned that a mineral deed only allowed the grantee the right to produce oil, gas, and minerals, but the subsurface strata were retained by the surface estate.[148] The court also acknowledged that both the English and American Rule could be applied to a depleted gas storage reservoir, but stated that if "it was the mineral interest owner and not the surface owner who had the power to grant storage rights, it would typically mean that hundreds of severed mineral interest owners would have to be contacted if those rights were to be obtained privately."[149] As a result, the court applied the American Rule to depleted reservoir rock and found that the surface owner was the rightful owner of underground gas storage rights.[150] In making its determination, the Court examined several deeds conveying the rights to the mineral state and determined that the deeds only allowed for "exploration, production and development, which ultimately gave the mineral owner the right to the minerals that may be produced."[151] The court stated:

> [i]t is clear in Oklahoma that a grant of minerals simply gives to the grantee the right to explore for, produce and reduce to possession, if found, the oil, gas and other minerals. It is an incorporeal interest analogous to a profit to hunt and fish on the land of another. Such a deed does not convey the minerals in place and does not convey the stratum of rock containing the pore spaces within which the oil and gas may be found. In the hard mineral area of the law and in the absence of language in

145. *Id*. at 439.
146. *Id*.
147. *Id*.
148. *Id.*
149. Ellis v. Ark. La. Gas Co., 450 F. Supp. 412, 422 (E.D. Okla. 1978).
150. *Id.*
151. *Id.*

> the severing deed dictating a different construction . . . the American view is that the cavern is owned by surface owners.[152]

In finding that the surface estate retains the rights to leave for underground natural gas storage, the court relied on *Sunray Oil Co. v. Cortex Oil Company*.[153] In *Sunray*, an oil and gas lessee sought injunctive relief against Sunray to enjoin its use of an abandoned well for disposal of salt water.[154] Sunray had obtained an assignment of an oil and gas lease on ten (10) acres on which the abandoned well was situated.[155] Sunray also obtained a license from the surface owner to dispose of its wastewater, produced from nearby operations, into the abandoned well.[156] The Oklahoma Supreme Court found that an oil and gas lease bestows only such minerals that are found and reduced to possession and vests no title to any oil or gas which is not extracted and reduced to possession.[157] Thus, the surface owner had the right to grant permission to inject wastewater into the subsurface as long as it did not interfere with the mineral estate's oil and gas operations.[158]

Sunray stands for the proposition that a landowner has the right to use the substrata notwithstanding an oil and gas lease in favor of another.[159] The *Ellis* court clearly relied on *Sunray* to determine that an oil and gas lease grants only production and exploration rights.[160] As a result of these two cases, it can clearly be concluded that the surface estate owns the rights for wastewater injection and natural gas storage or any right not expressly granted to the mineral owners or lessees.[161]

In addition to *Ellis* and *Sunray*, yet another Oklahoma case examined the rights of surface owners and mineral owners.[162] In *Storck v. Cities Service Gas Company*, plaintiffs leased subsurface formations for use as a gas storage facility and nine years later, also executed an oil and gas lease to another production company, subject to the gas storage lease.[163] The oil and gas lease was conditioned upon the right to produce and explore for oil and

152. *Id.* at 421.
153. *Id.*
154. Sunray Oil Co. v. Cortez Oil Co., 112 P.2d 792, 793 (Okla. 1941).
155. *Id.* at 793-95.
156. *Id.*
157. *Id.* at 793.
158. *Id.* at 795.
159. King, *supra* note 139, at 15.
160. *Id.*
161. Anderson, *supra* note 50, at 133.
162. King, *supra* note 139, at 15-16.
163. Storck v. Cities Serv. Gas Co., 1977 OK 227, 575 P.2d 1364, 1366.

gas outside of the gas storage formation and upon the consent of the defendant.[164] When the defendant was unwilling to provide consent, plaintiffs tried to void and cancel the gas storage lease.[165] The court upheld the gas storage lease and stated:

> [t]he gas storage lease is clearly not a mineral lease. The lease does not transfer title to minerals in place (native oil or gas) to Cities Service. We deem the provisions giving Cities Service title to all gas "… introduced, stored or removed" from the tract as simply preserving in Cities Service the ownership of the gas it injects under the Storck farm. Rather, the gas storage lease is a lease of real property. [Storcks], as reversioners, have the right to expect return of the property at the expiration of the lease in the same condition as when it was delivered to Cities Service, fair wear and tear excepted.[166]

Clearly, pursuant to *Storck*, a surface owner retains the right to lease underground storage facilities even when the mineral owner has executed an oil and gas lease.[167]

As for the cases filed in Beckham County, the district court took into consideration *Ellis*, *Sunray*, and *Storck* and found that the surface owners were entitled to all the compensation for the taking of gas storage rights.[168] However, the cases were not appealed and to date, the Oklahoma Supreme Court has not issued a definitive ruling.[169] Furthermore, it should be noted that *Ellis*, *Sunray*, and *Storck* did not address pore space ownership outside of the context of natural gas storage rights or wastewater injection.

2. Current Status of the Law in Oklahoma

Prior to 2011, Oklahoma courts had only addressed the topic of pore space ownership in the context of wastewater injection and natural gas storage. In 2011, the Oklahoma legislature made clear that pore space is a property right owned by the surface owner. Title 60 of Oklahoma Statutes, Section 6 specifically states:

> A. Land is the solid material of the earth, whatever may be the ingredients of which it is composed, whether soil, rock or other substance, and includes any pore space.

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164. *Id.* at 1366.
165. *Id.*
166. *Id.* at 1368.
167. King, *supra* note 139, at 15-16.
168. *Id.*
169. *Id.*

> B. 1. As used in this section, "pore space" means any interstitial space not occupied by soil or rock, within the solid material of the earth, and any cavity, hole, hollow or void space within the solid material of the earth.
>
> 2. As used in this section, pore space is real property and, until title to the pore space or rights, interests or estates in the pore space are separately transferred, pore space is property of the person or persons holding title to the land surface above it.
>
> 3. Notwithstanding the ownership of the pore space, nothing in this section shall alter or be construed to alter the ownership of, or rights associated with the oil or gas, as those terms are defined in Section 86.1 of Title 52 of the Oklahoma Statutes, that may be within the pore space.[170]

The Oklahoma statue is recent enough that there are no published decisions surrounding its enactment. It is quite possible litigation will arise relating to wastewater migration from commercial disposal wells. These operators typically buy small tracts of land and dispose of large amounts of wastewater. It is probable that this wastewater is migrating off of the land immediately above it. Theoretically, these cases are very plausible. Practically speaking, it is a theory wrought with evidentiary problems and political pressure in a state known to favor the energy industry. Oklahoma is set to be a proving ground for surface owner rights as they relate to pore space.

I. Pennsylvania

1. History

The Pennsylvania Department of Conservation and Natural Resources (herein "PDCNR") has taken great efforts to study and analyze the potential for significant CCS to take place within the state.[171] Ironically, ownership of the pore space in Pennsylvania is still an unsettled issue.[172]

170. 60 OKLA. STAT. § 6 (2011).

171. PA. DEP'T OF CONVERSATION & NATURAL RES., ASSESSMENT OF RISK, LEGAL ISSUES, AND INSURANCE FOR GEOLOGIC CARBON SEQUESTRATION IN PENNSYLVANIA 3-6 (Nov. 2009).

172. *Id.*

2. Current Status of the Law in Pennsylvania

Pennsylvania, just like most other states, recognizes (1) the surface estate, (2) the mineral estate, and (3) the right to subjacent support.[173] As separate, distinct, and severable estates, they are allowed to be owned by separate owners.[174] Further fragmentation is allowed by the severance of each specific mineral.[175] Whether pore space ownership belongs to the surface estate or mineral estate has not yet been determined, but several cases do provide some insight into what Pennsylvania might decide when faced with a decision regarding the ownership of the pore space.

For instance, in *United States Steel Corp. v. Hoge*, the surface owners and their predecessors in title had sold portions of the coal seam underlying their property to United States Steel Corporation.[176] The conveyance of the coal seam had a reservation in which the surface owners reserved the right to drill and operate through the coal seam for oil and gas without being held liable for any damages.[177] Thereafter, the surface owners conveyed their remaining gas and oil rights to Mr. Cunningham.[178] Cunningham began drilling wells into the coal seam to recover coalbed gas which resulted, in an action initiated by United States Steel Corporation to determine the ownership of and the right to develop the coalbed gas.[179] The district court ruled in favor of Cunningham, with a limitation that he could not conduct hydraulic fracturing in the coal seam and the Superior Court affirmed.[180]

However, the Pennsylvania Supreme Court reviewed the case as one of first impression and reversed the lower courts. The Pennsylvania Supreme Court was clear, "[t]he landowner, of course, has title to the property surrounding the coal, and owns such of the coalbed gas as migrates into surrounding property." [181] However, the United States Steel Corporation argued that the reservation only intended for there to be a right to drill through the coalbed seam to reach oil and gas in strata beneath the coal seam; an argument the Pennsylvania Supreme Court found to be more

173. Schuster v. Pa. Turnpike Comm'n, 149 A.2d 447, 449 (Pa. 1959); Machipongo Land & Coal Co., Inc. v. Commonwealth, Dep't of Envtl. Res., 719 A. 2d 19, 28-29 (Pa. Commw. Ct. 1998).

174. Chartiers Block Coal Co. v. Mellon, 25 A.597, 598 (Pa. 1893).

175. U.S. Steel Corp. v. Hoge, 468 A.2d 1380, 1383 (Pa. 1983).

176. *Id*. at 1381-82.

177. *Id*. at 1382.

178. *Id*.

179. *Id.* at 1382-84.

180. *Id*. at 1382.

181. *Id*. at 1383.

compelling.[182] The court found that even though the plain language of the conveyance likely reserved the right of development of the coalbed gas, there was no way the surface owners could have intended such a reservation when the conveyance was made because, at that time, coalbed gas was simply a waste product.[183] This decision is somewhat disturbing for surface owners because, historically, pore space has had little value. Based on the reasoning behind the holding in *Hoge*, it is possible that a Pennsylvania court might make a similar ruling, finding that a surface owner could not have intended to reserve the pore space while conveying oil and gas rights as it would likely not have been considered in such a conveyance because, until recently, ownership of the pore space had very little value.

In *Pomposini v. T.W. Phillips Gas & Oil Co*, yet another Pennsylvania case providing potential insight on future pore space ownership within the state, the court indicated that the surface estate maintains the right to natural gas storage unless the oil and gas lease explicitly conveys the right to store gas to another party.[184] Thus, in Pennsylvania, the right to natural gas storage is retained by the surface estate unless it is severed.[185] Logic provides that Pennsylvania courts would also hold that pore space is a right belonging to the surface estate, absent a previous severance.

Yet, the analysis is not this simple. When dealing with coal bed methane (herein "CBM") and other caverns, i.e. salt caverns, the PDCNR study noted:

> The treatment of CBM might also suggest that the surface owner would retain the rights to space (essentially caves) in deep karst formations and the pore space in sandstone formations. Karst formations are subterranean landscapes shared by the dissolution of layers of soluble bedrock, usually carbonate rock such as limestone or dolomite. Nevertheless, the fact that the minerals have not been removed could also lead a court to conclude that the mineral owner retains those rights.[186]

Although the law regarding natural gas storage seems to provide logical answers for questions regarding pore space ownership and CCS storage, it must be noted that CCS projects differ in one major way from natural gas. For example, the study done by PDCNR stated:

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182. *Id.* at 1384-85.

183. *Id.* at 1384.

184. Pomposini v. T.W. Phillips Gas & Oil Co., 580 A.2d. 776, 778-79 (Pa. Super. 1990).

185. *Id.*

186. PA. DEP'T OF CONVERSATION & NATURAL RES., *supra* note 171, at 3-6.

> There will likely be no market for the stored CO_2, thus it is likely that it will be considered to be a waste. Although CO_2 emitted into the ambient atmosphere is not a "solid waste," it is likely that CO_2 injected into the subsurface will be classified as such. The Federal Resource Conservation and Recovery Act (RCRA) defines "solid waste" as "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities." 42 U.S.C. § 6903(27). The Pennsylvania Solid Waste Management Act (PSWMA) defines "solid waste" as "Any waste, including but not limited to, municipal, residual or hazardous wastes, including solid, liquid, semisolid or contained gaseous materials." 35 Pa. Stat. Ann. § 6018.103. Because the carbon dioxide and other materials will have been compressed to a fluid, they will be a discarded liquid resulting from industrial or commercial activities and therefore a solid waste. If one determined that is was not a liquid because that definition would require that the substance be a liquid at ambient temperature and pressure, the material would still be a solid waste because it would be a "contained gaseous" material.[187]

3. Future of Pore Space Ownership in Pennsylvania

Pennsylvania has consistently recognized the right to store natural gas is belongs to the surface estate. Pennsylvania has also consistently recognized a right not previously conveyed is retained by the surface estate. Although, the *Hoge* decision appears to be based more on politics rather than sound jurisprudence, it is likely that Pennsylvania will determine that pore space is owned by the surface estate, provided the issue is well rooted in sound legal principles.

J. Texas

1. History

There has been very little case law in Texas specifically addressing the issue of pore space ownership, and of the few cases, there has been no general consensus on whether pore space is owned by the surface estate or whether it is owned by the mineral estate. Therefore, the following cases do

187. *Id.*

not provide much more than mere guidance on the future of pore space ownership in Texas.

In *Mapco v. Carter*, the court held that a subsurface storage area was owned by the mineral estate, which as a result, entitled the mineral owner to compensation for the use of the storage area.[188] The mineral owners in *Mapco* had created an underground storage cavern within a salt dome for the purpose of storing natural gas.[189] The walls were constructed of salt – a mineral in Texas – and therefore, the court stated, "Thus, the fee mineral owners retain a property ownership, right and interest after the underground storage facility—here, a cavern—had been created.[190] These same fee mineral owners are vested with ownership rights, including, of course, entitlement to compensation for the use of the cavern."[191] The court concluded that because the mineral owner held title to the underground salt as a mineral, the mineral owner also owned the storage rights in the cavern that was composed of such mineral.[192]

However, in contrast, in *Emeny v. United States*, the Federal Court of Claims, applying Texas law, found that the surface estate retained all property rights, except mineral rights previously conveyed, and as a result, the surface estate also retained the geological subsurface pore space.[193] In *Humble Oil Co. v. West*, the Texas Supreme Court cited *Emeny* approvingly, and stated:

> that the surface of the leased lands remaining as the property of the respective landowners included the geological structures beneath the surface, together with any such structure that might be suitable for the underground storage of extraneous gas produced elsewhere.[194]

However, in *Humble*, ownership of the pore space was not at issue, and instead, the case involved whether pore space could be used to store natural gas prior to all gas being produced.[195]

188. Mapco v. Carter, 808 S.W.2d 262, 274 (Tex. App. 1991), *rev'd in part on other grounds*, 817 S.W.2d 686 (Tex. 1991).
189. *Id*.
190. *Id*.
191. *Id*. at 264.
192. *Id*.
193. Emeny v. United States, 412 F.2d 1319 (Ct. Cl. 1969).
194. Humble Oil & Refining Co. v. West, 508 S.W.2d 812, 815 (Tex. 1974).
195. *Id.* at 817.

2. Current Status of the Law in Texas

Based on the forgoing case law, with one case awarding pore space ownership to the surface estate and one case awarding pore space ownership to the mineral estate, the current status of pore space ownership is undecided in Texas. However, it is fair to argue that *Mapco* is inapplicable to non-mineral, geological pore space ownership because the court in *Mapco* emphasized the fact that the cavern at issue was previously comprised of salt, or in other words, a mineral, and as such, was awarded to the mineral owner. Therefore, when taking into consideration that *Mapco* may not apply to non-mineral, geological pore space ownership, the result is that the surface estate has a strong interest in pore space ownership.

3. Future of Pore Space Ownership in Texas

Due to the current split in case law within Texas, it is difficult to predict the future of pore space ownership within the state. However, as previously mentioned, if *Mapco* does not apply to non-mineral, geological pore space ownership, there is a strong argument that Texas will allocate pore space to the surface estate.

Texas courts are typically very conservative in their rulings and the appellate courts in Texas fall right in line with their lower courts and are arguably even more conservative. Texas is a state that heavily favors oil and gas production and the energy industry. When you combine the conservative nature of Texas courts with the favor towards the energy industry, it is likely that any laws awarding pore space to surface owners will not mean much. The Texas courts will likely use the right of reasonable use and other public policy reasons to curtail litigation that might favor actions like trespass into surface owners' pore space.

K. Wyoming

1. History

Leading up to the enactment of House Bill 89 in 2008, which ultimately awarded pore space ownership to the surface estate, there was no case law within Wyoming addressing the issue.[196] However, in order to facilitate CCS, Wyoming was the first state within the United States to address the issue of pore space ownership.

196. Anderson, *supra* note 50, at 136.

2. Current Status of the Law in Wyoming

In July of 2008, pursuant to House Bill 89, Wyoming specifically addressed the issue of pore space ownership. The statute reads as follows:

> (a) The ownership of all pore space is all strata below the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata.
>
> (b) A conveyance of the surface ownership of real property shall be a conveyance of the pore space in all strata below the surface of such real property unless the ownership interest in such pore space previously has been severed from the surface ownership or is explicitly excluded in the conveyance. The ownership of pore space in strata may be conveyed in the manner provided by law for the transfer of mineral interests in real property. No agreement conveying mineral or other interests underlying the surface shall act to convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest.
>
> (c) No provision of law, including a lawfully adopted rule or regulation, requiring notice to be given to a surface owner, to an owner of the mineral interest, or to both, shall be construed to require notice to persons holding ownership interest in any pore space in the underlying strata unless the law specifies notice to such persons is required.
>
> (d) As used in this section, the term "pore space" is defined to mean subsurface space which can be used as storage space for carbon dioxide or other substances.
>
> (e) Nothing in this section shall be construed to change or alter the common law as of July 1, 2008, as it relates to the rights belonging to, or the dominance of, the mineral estate. For the purpose of determining the priority of subsurface uses between a severed mineral estate and pore space as defined in subsection (d) of this section, the severed mineral estate is dominant regardless of whether ownership of the pore space is vested in the several owners of the surface or is owned separately from the surface.
>
> (f) All instruments which transfer the rights to pore space under this section shall describe the scope of any right to use the surface estate. The owner of any pore space right shall have no

> right to use the surface estate beyond that set out in a properly recorded instrument.
>
> (g) Transfers of pore space rights made after July 1, 2008 are null and void at the option of the owner of the surface estate if the transfer instrument does not contain a specific description of the location of the pore space being transferred. The description may include but is not limited to a subsurface geologic or seismic survey or a metes and bounds description of the surface lying over the transferred pore space. In the event a description of the surface is used, the transfer shall be deemed to include pore space at all depths underlying the described surface area unless specifically excluded. The validity of pore space rights under this subsection shall not affect the respective liabilities of any party and such liabilities shall operate in the same manner as if the pore space transfer were valid.
>
> (h) Nothing in this section shall alter, amend, diminish or invalidate rights to use of the subsurface pore space that were acquired by contract or lease prior to July 1, 2008.[197]

Thereafter, in 2009, the Governor of Wyoming signed House Bill 57, further clarifying that the mineral estate remains dominant over the surface estate, even though the statute grants the pore space to the "owners of the surface above the strata."[198]

3. Future of Pore Space Ownership in Wyoming

Although it has already been statutorily determined that the surface estate is the owner of pore space, Wyoming is still of special interest because of the millions of acres of federally-owned or Indian-owned mineral rights encompassing the state.[199] Since neither Wyoming case law nor statutory law can determine whether pore space ownership would be included in federally-owned or Indian-owned mineral rights, it would be necessary to look to federal case law.[200] However, at this time, there is no federal case law addressing pore space ownership.[201] It is unlikely, though, that the federal government's limited reservation of minerals, such as coal, would reserve the right to pore space ownership.[202] Conversely, it has been

197. WYO. STAT. ANN. § 34-1-152(a) (2013).
198. *Id.*
199. Anderson, *supra* note 50, at 136-38.
200. *Id.*
201. *Id.*
202. *Id.*

noted that a broad reservation of minerals, such as the reservation pursuant to the Stock-Raising and Homestead Act of 1916 ("SHRA"), might reserve pore space ownership in the federal government because of the very broad interpretation given to the reservations by the federal government.[203] For instance, in *Watt v. Western Nuclear Inc.*, the court found that "gravel" was a mineral and stated: "we interpret the mineral reservation in the Act to include substances that are mineral in character . . . , that can be removed from the soil, that can be used for commercial purposes, and that there is no reason to suppose were intended to be included in the surface estate."[204] In addition, the court further stated:

> Finally, the conclusion that gravel is a mineral reserved to the United States in lands patented under the SRHA is buttressed by "the established rule that land grants are construed favorably to the Government, that nothing passes except what is conveyed in clear language, and that if there are doubts they are resolved for the Government, not against it." [citations omitted] . . . In the present case this principle applies with particular force, because the legislative history of the SRHA reveals Congress' understanding that the mineral reservation would "limit the operation of this bill strictly to the surface of the lands."[205]

Despite the broad nature of this statement of legislative intent, it is unlikely that it is broad enough to encompass federal ownership of pore spaces.[206] It is clear that the Act was focused on reserving minerals and not pore spaces.[207]

L. Other States: Michigan, New York, Louisiana, and West Virginia

In addition to the states previously discussed, there are several other states with case law worth noting. Although these states have not specifically addressed pore space ownership, the case law provides a broader understanding of the overall trend regarding pore space ownership within the United States.

Michigan case law clearly supports the vesting of pore space ownership with the surface estate when considering the right to the subsurface storage of natural gas.[208] For instance, in *Department of Transportation v. Goike*,

203. *Id.*
204. Watt v. W. Nuclear Inc., 462 U.S. 36, 53 (1983).
205. *Id.* at 59.
206. Anderson, *supra* note 50, at 136-38.
207. *Id.*
208. *Id.*

the state acquired the surface of a tract of land, from the fee simple owner, in order to make improvements to a highway.[209] As a result, the fee simple owner was left with only the mineral estate.[210] It was requested that the Court determine ownership of the right to store non-native gas in subsurface pore space and found that "the storage space, once it has been evacuated of the minerals and gas, belongs to the surface owner."[211]

Although the law in Louisiana is significantly different from that in the rest of the United States, Louisiana case law has also weighed in on the issue of pore space ownership. In *United States v. 43.42 Acres of Land*, the court found that the surface owner was vested with pore space ownership when it stated, "[w]hether a state is governed by an 'ownership' or 'non-ownership' theory of mineral rights, the mineral owner cannot be considered to have ownership of the subsurface state containing the spaces where the minerals are found."[212] Similarly, in *Mississippi River Transmission Corp. v. Tabor*, it was held that although the surface owner has the right to authorize subsurface storage, the "mineral servitude owner . . . enjoys the 'right to participate in the production of the remaining natural gas and condensate in the reservoir' . . . and must be compensated for the expropriation of this right."[213]

In New York there are two cases that provide insight into the pore space ownership within the state. In *International Salt Co. v. Geostow*, the court found the conveyance of salt mines meant that the grantee held title to the salt, but not to the excavation cavity.[214] However, the court also found that the grantee had the exclusive right to use the cavity so long as salt remained and the mining operations were not abandoned.[215] Similarly, in *Home Gas Co. v. Miles*, the court held the right to store injected gas belonged to the surface owner.[216] These two cases considered together suggest that surface owners hold title to the space, while the mineral owner has a right to the pore space so long as there are ongoing mineral operations.[217]

In West Virginia, based on current case law, it appears that pore space is vested with the surface estate.[218] In *Tate v. United States Fuel Gas Co.*, it

209. Dep't of Transp. v. Goike, 560 N.W.2d 365, 365 (Mich. Ct. App. 1996).
210. *Id.*
211. *Id.*
212. United States v. 43.42 Acres of Land, 520 F. Supp. 1042, 1046 (W.D. La. 1981).
213. Miss. River Transmission Corp. v. Tabor, 757 F.2d 662, 672 (5th Cir. 1985).
214. Int'l Salt Co. v. Geostow, 878 F.2d 570 (2d Cir. 1989).
215. *Id.*
216. Home Gas Co. v. Miles, 358 N.Y.S.2d 846, 858 (Sup. Ct. 1974) *modified*, 364 N.Y.S.2d 213 (App. Div. 1975).
217. Anderson, *supra* note 50, at 136.
218. *Id.*

was found that the surface owner held title to the subsurface space for natural gas storage.[219] At issue in the case was a deed that severed a mineral estate in "[t]he oil, gas, and brine and all minerals, except coal underlying the surface of the land," and further stated that minerals included, "clay, sand, stone, or other minerals [that] may be necessary for the operation for the oil, gas and other minerals reserved and excepted."[220] Based on the deed, the court held the surface estate held title to the subsurface, including any clay, sand, and stone, so long as the mineral owner had the right to use these substances if necessary to facilitate oil, gas, and mining operations.[221] As a result, the court found the surface owner could grant natural gas storage rights to the subsurface as long as there was no longer any recoverable minerals in the stratum at issue.[222]

In *Faith United Methodist Church v. Morgan*, yet another West Virginia case, the Supreme Court of Appeals construed a deed of the "surface only" and held the term "surface only" was not ambiguous.[223] Further, the court held the word "surface" when used in an instrument of conveyance "means the exposed area of the land, improvements on the land, and any part of the underground actually used by a surface owner as an adjunct to surface use (for example, medium for the roots of growing plants, groundwater, water wells, roads, basements or construction footings).[224] Interestingly, the subsurface uses permitted do not include pore space. Therefore, if "surface only" is not ambiguous then it should mean either: (1) the surface owner gets everything—as though the deed were simply using surface as a reference to the ad coelum doctrine; or (2) the surface owner gets everything except which would be defined as minerals suitable for mining. In other words, the word "surface" or "surface only" should at least give the surface owner what he would ordinarily get where minerals had been reserved—surface implicitly should include airspace and subsurface which can be used and enjoyed in the traditional manner of surface ownership. Thus, a surface owner should get storage rights.

219. Tate v. United Fuel Gas Co., 71 S.E.2d 65 (W. Va. 1952).
220. *Id.* at 68.
221. *Id*. at 72.
222. *Id.*
223. Faith United Methodist Church v. Morgan, 745 S.E.2d 461, 477 (W. Va. 2013).
224. *Id.* at 480-81.

IV. Legal and Practical Considerations of Pore Space Rights

A. Valuation of Pore Space

"Throughout all history relating to underground land uses, there appears to be a difference between the actual market value impact and what practically goes on in the real world."[225] Valuing the use of pore space will likely come down to what the particular use is and how much that particular user is willing to pay as opposed to what occupying the land below the ground is actually worth. There are several reasons which support this theory. First, it is likely to be difficult to analyze the devaluation to either the surface or mineral estate from the occupation of the pore space. Determining the devaluation will be even more difficult when neither the surface nor mineral estate is utilizing the pore space for any practical purpose. Second, pore space is something which is hard to view as a tangible medium and as a general rule intangible items become harder to value. Third, just like with underground gas storage, pipeline and power line companies will typically pay more than the market value for easement rights because it is a more cost efficient solution in comparison with initiating eminent domain proceedings and incurring costly litigation expenses.

The idea of paying more for something you need than what it is worth is not a new concept:

> In many instances of underground uses of land, the amount of the payment is less a function of the diminution in market value resulting from the existence of the right of way and the utility than it is a function of custom. Numerous studies have been made to show that there is no actual negative impact on market value of a five-foot easement along the side line of a residential property for a sewer main. The utility companies are willing to pay for these rights of way rather than go through the costly process of litigating them. Paired sales show no losses. When they are litigated, appraisers and courts have by custom given the property owner from 25 to 100 percent of the market value contribution of the strip of land.[226]

The most valuable use for pore space at the present time is likely to be for its value in oil and gas development because operators do not have the

225. Max J. Derbes, Jr., *The Appraisal of Underground Easements*, RIGHT OF WAY (Int'l Right of Way Ass'n), Oct. 1992, at 16, *available at* https://www.irwaonline.org/eweb/upload/1002b.pdf.

226. *Id.* at 16.

power of eminent domain. As directional drilling continues, operators will need sub-surface easements to access adjoining parcels in which they do not own lease rights. The disposal of salt water in underground injection wells is another major area where pore space may become a valuable resource. As surface owners become more educated about pore space ownership and as technology improves, it is highly likely that operators will need to acquire rights to the pore space in order in continue to inject waste in areas outside of the drilling units. These uses will likely help to maximize the value of pore space.

B. CO_2 Sequestration

In 2006, Al Gore's *An Inconvenient Truth* brought to light and fueled the debate surrounding carbon dioxide (CO_2) emissions.[227] Since that time, international studies and scientific reports continue to support that global warming is a real concern and that carbon dioxide is a major cause of climate change.[228] For instance, nearly eighty-five percent of the energy produced within the United States comes from the combustion of fossil fuels and it is predicted that fossil fuels will remain the primary source of energy for the near future.[229] In addition, coal represents a staggering forty-nine percent of the United States' existing electric-generating capacity.[230] Not surprisingly, the United States is the second largest emitter of greenhouse gases, sixty percent of which is carbon dioxide.[231] [232] As society looks for answers, carbon capture and sequestration (CCS) is at the forefront of the viable solutions.[233] This process can potentially remove eighty to ninety-five percent of the CO_2 emitted from power plants.[234] Studies have indicated that global sequestration capacity in depleted oil and gas fields is substantial, with the capacity to store 125 years of current

227. AN INCONVENIENT TRUTH (Paramopunt Classics 2006).

228. *Id.*

229. Stephanie M. Haggerty, *Legal Requirements for Widespread Implementation of CO2 Sequestration in Depleted Oil Reservoirs*, 21 PACE ENVTL. L. REV. 197, 197 (2003).

230. Victor B. Flatt, *Paving the Legal Path for Carbon Sequestration from Coal,* 19 DUKE ENVTL. L. & POL'Y F. 211, 211 (2009).

231. China, as the world's largest emitter of greenhouse gas, is also a major concern as the county depends heavily on coal-fired generation and has more coal than any other energy source. *See* Edward H. Ziegler, *China's Cities, Globalization, and Sustainable Development: Comparative Thoughts on Urban Planning, Energy, and Environmental Policy*, 5 WASH. U. GLOBAL STUD. L. REV. 295, 300 (2006).

232. Flatt, *supra* note 230.

233. *Id*.

234. *Id.*

worldwide CO_2 emissions from fossil fuel fired power plants.[235] Although CO_2 is routinely injected into subsurface pore space in an effort to aid in the recovery of oil and gas, and though large-scale sequestration sites have been identified within the United States, there are currently no large-scale, commercial sequestration projects underway in the United States.[236] However, numerous states have enacted carbon sequestration legislation and more are following suit.[237] Despite the surge in carbon sequestration legislation, two commentators have suggested the existing federal and state framework currently in place for Enhanced Recovery Operations "adequately addresses many aspects of the needs of such a CCS infrastructure, especially if the early phase of CCS implementation builds on the EOR infrastructure."[238] Further, they warn against the creation of detailed regulations that may not come into existence for years and ultimately impede CCS.[239] Instead, it is suggested that CO_2 be injected into the best known and recognized of potential "oil and gas reservoirs that have already been identified, described and even unitized for enhanced oil recovery by the injection of CO_2."[240] Although this presents a good argument, regulatory and legal issues, such as jurisdiction, liability, and property rights, still abound.[241]

1. Jurisdiction

In order to accurately address all the issues surrounding potential CCS legislation and the regulation of CCS, it is vital to accurately define what qualifies as CCS.[242] In addition, legislatures will need to define or create administrative structures to deal with these massive projects. This will be the case regardless of whether the projects are done by private companies or the government.

2. Liability Management

Liability is a potential barrier facing CCS operations. Despite numerous studies that have indicated that large-scale, commercial CCS operations should bring little risk of harm to humans and the environment, the

235. Haggerty, *supra* note 229.
236. Flatt, *supra* note 230, at 213.
237. *Id.*
238. Philip M. Marston & Patricia A. Moore, *From EOR to CCS: The Evolving Legal and Regulatory Framework for Carbon Capture and Storage*, 29 ENERGY L.J. 421,490 (2008).
239. *Id.*
240. *Id.*
241. Flatt, *supra* note 230, at 214.
242. *Id.* at 215.

uncertainty regarding long-term reliability makes it difficult to promote CCS.[243] Legislatures will be faced with creating legislation that assigns liability to the appropriate source and protects the public health and safety from large surface releases and also appropriately protects property rights.[244] A large surface release could pose risks to humans, such as asphyxiation or other effects caused by prolonged exposure to CO_2.[245] With respect to property protection, it is important to account for the nature of CO_2 when stored underground.[246] Carbon dioxide is like water and oil and is a fugitive substance and as a result, when injected underground, CO_2 naturally migrates throughout the pore space.[247] Due to the future nature of CO_2, it would be possible for CO_2 to cause saline intrusion into potable aquifers, make sources of oil and gas unattainable, create pressure changes within the ground, and even trigger seismic events.[248] The causes of action we will likely see from this type of activity are negligence, negligence per se, subsurface trespass, nuisance, and strict liability. As owners of pore space consider leasing their pore space rights, they want to make sure they have indemnification provisions to protect themselves if these types of cases arise due to the operations of the CCS operator.

3. Property Rights/Government Ownership

Although the injection of carbon dioxide into geologic formations is not new, as it has been used for decades in enhanced oil recovery operations, the geologic storage of immense amounts of carbon dioxide for hundreds or thousands of years creates complex property issues.[249] Carbon dioxide can be stored in a number of different geologic formations such as depleted oil and gas reservoirs, saline aquifers, coal seams, and deep sub-seabed formations.[250] It is likely most geologic sequestration will occur in saline formations as a result of their broad distribution and large storage potential.[251] However, it is also likely most initial carbon sequestration projects will utilize depleted oil and gas reservoirs because of the availability, the quality of existing subsurface data, and the potential for economic return.[252] Thus, one of the barriers to a viable CCS project is the

243. *Id.* at 220.
244. *Id.* at 220-22
245. *Id.*
246. *Id.*
247. *Id.*
248. *Id.*
249. *Id.* at 229.
250. *Id.*
251. *Id.* at 230.
252. *Id.*

acquisition of the pore space. This occurs regardless of whether the pore space is owned by the surface or mineral estate. These projects require massive amounts of subsurface acreage in order to be economically feasible. It is in these types of projects that it seems to make the most sense for pore space to be owned by the government. Otherwise, it will be extremely costly for CCS operators to acquire enough contiguous acreage in order to make the projects work. There is always eminent domain, but that is also likely to be cost prohibitive.

One such commentator, in an effort to resolve the issues associated with acquiring massive amounts of subsurface acreage for the purposes of CCS, has suggested that ownership of a surface owner's rights to the subsurface should be restricted to 1,000 feet.[253] This approach is based on a notion that a surface owner's rights should only extend to what is reasonably necessary to facilitate the owner's use of the surface.[254] In much the same way as airspace cases have whittled away the surface owner's use of airspace to only the zone immediately above the land surface (around 500 feet), this model seeks to limit the surface owner's use of subsurface to 1,000 feet which allow the federal government to regulate access to large subsurface areas below 1,000 feet for uses such as carbon sequestration, heat mining, and other future technologies.[255] This model does fail to recognize that most oil, gas, and hard rock mineral operations operate at levels below 1,000 feet. As a result, the commentator suggests altering the model to honor all existing rights to extract minerals, thus protecting the mineral estate.[256] Ultimately, the commentator concludes by stating that the *ad coelum* doctrine is a relic that should be demolished.[257] Specifically, the commentator states:

> The idea that the surface owner held title up to the heavens could be dismissed as harmless hyperbole until it threatened the development of the airplane. Given our modern scientific knowledge and new advances in subsurface technology, we must now confront the equally foolish notion that the surface owner holds title to the center of the earth--including a slice of the planet's molten core. Lacking support in either law or logic, the

253. Sprankling, *supra* note 4, at 1037.
254. *Id.*
255. *Id.* at 1038.
256. *Id.*
257. *Id.* at 1038-39.

> center of the earth approach is merely a curious relic from a bygone age.[258]

Whether or not the *ad coelum* doctrine should be disregarded is an argument for another day; however, there is something to be said for the argument that the state or federal government or public utilities should have access to subsurface areas to allow for CCS.

Another commentator, Professor David Pierce, has offered yet another approach. Professor Pierce argues that a correlative right approach, a doctrine that has long been applied to subsurface oil and gas resources, would allow landowners to have a legally protected opportunity to use the subsurface in correlation with other landowners—essentially forming a community of subsurface owners.[259] Such an approach would balance a landowner's right to use the subsurface with the community's opportunity to make productive use of the subsurface. For example, in most instances the only valuable use of pore space will be its commercial value for CCS, which would only be beneficial to a "community" of landowners. Under Professor Pierce's approach, the community would be allowed to benefit, regardless of any individual dissenting community members.

C. Subsurface Trespass

Historically, trespass has been characterized by "a series of actions for harm to person or property."[260] Although the exact origins of trespass are unknown, it is believed that the writ of trespass was popular in early England because it was one of the first to allow for the recovery of money damages.[261] Over time the writ of trespass evolved with the following being the three most important forms: (1) trespass to the person; (2) trespass to chattels; and (3) trespass to real property.[262] The varying forms of trespass have continued to evolve and offer flexible relief based on varying circumstances. Thus, it makes perfect sense that trespass should continue to

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258. *Id.*

259. Professor Pierce has written a series of articles on this: David E. Pierce, *Oil and Gas Easements*, 34 ENERGY & MIN. L. INST. 318, 319-21 (2012); David E. Pierce, *Developing a Common Law of Hydraulic Fracturing*, 72 U. PITT. L. REV. 685, 693-95 (2011); David E. Pierce, *Carol Rose Comes to the Oil Patch: Modern Property Analysis Applied to Modern Reservoir Problems*, 19 PENN ST. ENVT'L L. REV. 241, 255-64 (2011) [hereinafter Pierce, *Carol Rose Comes to the Oil Patch*]; and David E. Pierce, *Minimizing the Environmental Impact of Oil and Gas Development by Maximizing Production Conservation*, 85 N.D. L. REV. 759, 768-72 (2009).

260. Owen L. Anderson, *"Subsurface Trespass": A Man's Subsurface Is Not His Castle*, 49 WASHBURN L.J. 247, 251 (2010).

261. *Id*. at 252.

262. *Id.* at 253.

evolve to meet the needs of a constantly changing and modern society.[263] More specifically, trespass should evolve to address disputes involving subsurface land use.[264]

In the early days of the petroleum industry, little attention was given to the idea of a subsurface trespass.[265] Instead, mineral owners, compelled by the Rule of Capture[266], often constructed as many wells as possible in order to protect against drainage.[267] However, technological advancements, such as subsurface horizontal drilling and reservoir stimulation techniques, are now so commonplace that courts are faced with deciding whether these techniques, which often encroach upon subsurface property rights, give rise to an action in trespass.[268]

Subsurface trespass law has developed from traditional surface trespass.[269] In the early 1900's, upon the discovery of oil in Texas and California, there was a surge of drilling rights disputes to which courts applied ordinary trespass principles and often found that "one who unlawfully entered the land of another to drill for and produce oil was a trespasser, and was therefore not entitled to the oil severed from the land."[270] However, if the trespasser had acted in good faith, courts often permitted recovery of drilling and production expenses, but when the trespasser acted in the absence of good faith, courts were much less likely to allow the trespasser to recoup expenses and the lawful owner was left with a free producing well.[271] It was from these principles that the law of subsurface trespass evolved and by its most general definition is "the

263. *Id.*

264. *Id.*

265. Levi Rodgers, *Subsurface Trespass by Hydraulic Fracturing: Escaping* Coastal v. Garza*'s Disparate Jurisprudence Through Equitable Compromise*, 45 TEX. TECH L. REV. ONLINE EDITION 99, 112 (2012-2013).

266. The Rule of Capture, which originally applied to groundwater, defines the rights of a mineral owner to oil and gas in place. The Rule holds that a mineral owner only acquires title to the hydrocarbons produced from wells located on his property, regardless of whether part of the oil or gas migrated from neighboring lands, upon production. As this point, the oil and gas has been reduced to possession. Further, the Rule of Capture removes all liability from the mineral owner. For instance, a mineral owner would have no liability if hydrocarbons produced from his well were drained from neighboring land. The Rule has, however, been limited over the years in order to prevent economic and physical waste. *See id.* at 109-10.

267. *Id.* at 112.

268. Owen L. Anderson, *Lord Coke, the Restatement, and Modern Subsurface Trespass Law*, 6 TEX. J. OIL GAS & ENERGY L. 203, 204 (2010-11).

269. Rodgers, *supra* note 265, at 112.

270. *Id*.

271. *Id*. at 112-13.

unlawful physical entry onto the mineral estate of another."[272] Application of subsurface trespass law was straightforward in the early days of the oil and gas industry.[273] For instance, intent was not required to be shown as long as the subsurface trespass was direct and volitional.[274] However, as previously mentioned, recent technological advancements have made it difficult to determine when certain subsurface operations can be considered a subsurface trespass.[275]

Further, some commentators are beginning to suggest that subsurface trespass law should develop similarly to airspace law. In general, the use of airspace by airplanes is only actionable if a landowner suffers actual damages.[276] For instance, in *United States v. Causby*, the respondents, owners of a chicken farm adjacent to a military airport owned by the United States, brought suit against United States and alleged that their property had been taken pursuant to the Fifth Amendment.[277] It was found that the military aircraft often just barely missed the tops of Respondents' trees and that the noise was so startling the Respondents were forced to give up their chicken business as many of the chickens were killed from flying into the walls from fright.[278] As a result, the U.S. Supreme Court held that the use of airspace by military aircraft caused actual and substantial damages to a chicken farmer which constituted a taking because the use of the property, as a commercial chicken farm, was completely destroyed.[279] In doing so, the Court stated:

> It is ancient doctrine that at common law ownership of the land extended to the periphery of the universe—Cujus est solum ejus est usque ad coelum. But that doctrine has no place in the modern world. The air is a public highway, as Congress has declared. Were that not true, every transcontinental flight would subject the operator to countless trespass suits. Common sense revolts at the idea. To recognize such private claims to the airspace would clog these highways, seriously interfere with their control and development in the public interest, and transfer

272. *Id*. at 113.
273. *Id*.
274. *Id*.
275. *Id*.
276. Anderson, *supra* note 260.
277. United States v. Causby, 328 U.S. 256, 259 (1946).
278. *Id*. at 260.
279. *Id*.

> into private ownership that to which only the public has a just claim.[280]

In opposition, when a plaintiff fails to prove actual damages, courts have denied both money damages and injunctive relief and have further warned that the *ad coelum* doctrine is not to be "taken literally" as "[t]itle to the airspace unconnected with the use of land is inconceivable."[281] In much the same way, commentators are now suggesting that "subsurface trespass claims should be limited to situations in which the subsurface owner, suffers actual and substantial damages in the use and enjoyment of his land."[282] In other words, relief should be denied absent actual and substantial damages.[283] However, as will be revealed below, case law on subsurface trespass is neither unified nor coherent.[284] Another commentator reaches much the same conclusion, but does so by arguing that, because the deep surface cannot be effectively fenced off from neighbors, that landowners should be regarded as having correlative or community rights to use subsurface formations.[285]

1. Traditional Oil and Gas Subsurface Trespass: Deviated, Directional, and Horizontal Wells

The most obvious example of an actionable trespass in this context is a directional well that bottoms out under neighboring property.[286] Under this scenario, a well is drilled and often passes through thousands of feet before it ever even enters the neighboring property.[287] However, this situation can still give rise to an actionable trespass due to the well-established principle of property law that prevents the use of the surface to support mineral extraction activities on other lands.[288] In such a situation, a prior determination of pore space ownership would allow operators an opportunity to obtain consent from the correct persons and avoid a trespass situation.[289] This could be very beneficial as courts are often willing to find

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280. *Id*.
281. Hinman v. Pac. Air Lines Transp. Corp., 84 F.2d 755 (9th Cir. 1936).
282. Anderson, *supra* note 260, at 255.
283. *Id.*
284. *Id*.
285. Pierce, *Carol Rose Comes to the Oil Patch*, *supra* note 259, at 255-64.
286. Rodgers, *supra* note 265, at 113.
287. Bruce M. Kramer, *Horizontal Drilling and Trespass: A Challenge to the Norms of Property and Tort Law*, 25 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 291, 325 (2014).
288. *Id.* at 326.
289. *Id.* at 325.

that a subsurface trespass has occurred regardless of whether the action was intentional or by accident.[290] For example, the Texas Supreme Court, in *Hastings Oil Co. v. Texas Co.*, upheld an injunction that was granted after a well drilled by Hastings deviated from its vertical path and bottomed out beneath land owned by Texas.[291] It was found that in equity, courts are allowed greater latitude in instances of trespass to mining property than trespass to real property because "the injury goes to the immediate destruction of minerals which constitute the chief value of this species of property."[292]

2. Hydraulic Fracturing

Currently, the leading opinion on hydraulic fracturing is *Coastal Oil & Gas Corp. v. Garza Energy Trust.*[293] Here, the operator clearly entered into the adjoining property with its fracturing operations. Regardless, the Texas Supreme Court reasoned that there must be an injury and the only injury in this case was precluded by the rule of capture. Even though the jury found that a subsurface trespass occurred, the Court based its holding on the fact that hydraulic fracturing prevented underground waste of hydrocarbons by allowing its recovery from tight reservoirs that would not otherwise be productive and was necessary to meet an important social need.[294] Ultimately, in terms of subsurface trespass, the *Garza* Court's most important statement was this, "[t]he law of trespass need no more be the same two miles below the surface than two miles above."[295] Although this reasoning wisely protects the well-established and necessary practice of hydraulic fracturing, it also gives an inference that a Texas court would be reluctant to find a trespass in a pore space case.

3. Secondary and Enhanced Recovery Operations

Secondary or enhanced recovery operations are used to maintain or increase production of a well once the reservoir's natural production decreases.[296] Although states often recognize secondary or enhanced recovery as a valid public interest, trespass issues can arise in instances when an operator injects a substance, such as salt water, carbon dioxide, chemicals, or natural gas, into the subsurface of its own property in order to

290. Rodgers, *supra* note 265, at 113.
291. Hastings Oil Co. v. Texas Co., 234 S.W.2d 389, 398 (Tex. 1950).
292. Rodgers, *supra* note 265, at 113-14; *Hastings*, 234 S.W.2d at 398.
293. Coastal Oil v. Garza, 268 S.W.3d 1 (Tex. 2006).
294. Anderson, *supra* note 260, at 258-59.
295. *Id.*; *Garza*, 268 S.W.3d at 11.
296. Rodgers, *supra* note 265, at 116.

increase production and the injected substance invades the subsurface of the neighboring property.[297] These cases, again, are not as straightforward as cases involving a directional well that deviates across ownership boundaries due to the fact that oil reserves on the invaded property are displaced or when the invading substances makes recovery of the reserves more difficult and expensive.[298] The case law in this area is mixed; however, a few of the cases seem to suggest that it is less likely that a subsurface trespass will be found when a regulatory agency has authorized the operations.[299] For instance, in *Railroad Commission of Texas v. Manziel*, a group of landowners sought to set aside and cancel an order permitting the injection of water into a well at an irregular spacing which was issued by the Railroad Commission to owners of an adjoining tract.[300] The landowners argued that the injected water would constitute a trespass and ultimately water-out their own wells.[301] The Railroad Commission argued that it must have the authority to grant the location of water injection wells to prevent drainage and to protect correlative rights in order to encourage operators to initiate secondary recovery programs.[302] The court upheld the Railroad Commission's order and found the social utility derived from secondary recovery operations as persuasive and stated:

> [I]f, in the valid exercise of its authority to prevent waste, protect correlative rights, or in the exercise of other powers within its jurisdiction, 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.[303]

To support its conclusion, the court quoted Professors Howard Williams and Charles Meyers:

> What may be called a 'negative rule of capture' appears to be developing. Just as under the rule of capture a landowner may capture such oil or gas as will migrate from adjoining premises to a well bottomed on his own land, so also may he inject into a

297. *Id*.
298. Anderson, *supra* note 260, at 230-36.
299. *Id*.
300. R.R. Comm'n of Tex. v. Manziel, 361 S.W.2d 560 (Tex. 1962).
301. *Id*.
302. *Id*. at 565.
303. *Id*. at 568-69.

> formation substances which may migrate through the structure to the land of others, even if it thus results in the displacement under such land of more valuable with less valuable substances[.][304]

The court was, however, sympathetic to the notion that traditional trespass rules may not be appropriate when applied to subsurface trespasses that involve secondary recovery due to such a strong societal need. As a result, the court's discussion seems to suggest that a regulatory order, issued in the interest of the public, is necessary in order to avoid traditional trespass rules.[305]

In addition to Texas, several other states have weighed in and found no actionable trespass when secondary recovery operations were involved. For instance, in *Crawford v. Hrabe*, after the lessee injected wastewater into the lessors' subsurface, the lessors claimed that their interests would be injured by the migration of the wastewater throughout the subsurface.[306] However, the Kansas Supreme Court held that there was no actionable trespass after surveying other jurisdictions' treatment of subsurface trespass of wastewater and finding that the traditional rules of trespass usually do not apply to subsurface trespass when wastewater is injected to increase production.[307]

Similarly, in *Syverson v. North Dakota Industrial Commission*, a North Dakota court upheld a regulatory order authorizing secondary recovery operations over the objection of a small number of lessors within the field where the record indicated that they were given a fair opportunity to join in operations but refused to do so.[308] The court noted that the unit operations were designed to increase ultimate recovery from the reservoir and that the lessors had not shown that they would suffer any actual harm as a result of such operations.[309]

On the other hand, in *Cassinos v. Union Oil Co. of California*, a California appellate court found that actual damage occurred to production operations on neighboring property when wastewater was injected into a petroleum reservoir.[310] The court held that the damage constituted an actionable trespass against the neighboring mineral estate.[311] In reaching

304. *Id*. at 568.
305. *Id*.
306. Crawford v. Hrabe, 44 P.3d 442 (Kan. 2002).
307. *Id*.
308. Syverson v. N.D. State Indus. Comm'n, 111 N.W.2d 128 (N.D. 1961).
309. *Id.*
310. Cassinos v. Union Oil Co., 18 Cal. Rptr. 2d 574 (Ct. App. 1993).
311. *Id.*

this decision, the court cited three Oklahoma cases, finding one to be analogous because saltwater injection operations had caused actual damages to nearby wells, and distinguishing the other two cases because the injection operations did not cause actual damages.[312]

Oklahoma recognizes a cause of action for private nuisance when injected water injures another's interest in a well or leasehold, even though the water was injected for enhanced oil recovery pursuant to a regulatory permit.[313] However, the requirement of showing actual injury or recoverable damages remains.[314] Regarding the disposal of saltwater produced from petroleum wells, the court recognized that "[i]f such disposal of saltwater is forbidden unless oil producers first obtain the consent of all persons under whose lands it may migrate or percolate, [then] underground disposal would be practically prohibited."[315]

Generally, when secondary recovery is involved, it appears that most courts are unwilling to find that the migration of wastewater onto neighboring properties as a trespass. This is likely because secondary recovery is in the best interest of the public and industry. With that said, there appears to be no clear case law challenging this logic specifically in the realm of pore space.

4. Wastewater Injection Wells

Another form of subsurface trespass occurs when fluids from a wastewater injection well migrate beyond the boundary of the property where the well is located. Essentially the same as a subsurface trespass that occurs during a secondary or enhanced recovery operation, but differing only in that the fluid is injected into a wastewater disposal well and is not intended to enhance a reservoir's natural production. Of particular interest for this specific topic is a case out of Texas: *FPL Farming Ltd.("FPL") v. Environmental Processing Systems, L.C.* ("EPS").[316]

In *FPL*, FPL Farming Ltd. owned land in Liberty County, Texas, which it used primarily for rice farming.[317] EPS leased an adjacent piece of property where it constructed and operated a wastewater disposal facility.[318]

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312. *Id.* at 580 (citing *W. Edmond Hunton Lime Unit v. Lillard*, 265 P.2d 730, 731–32 (Okla. 1954); *Sunray* Oil *Co. v. Cortez* Oil *Co.*, 112 P.2d 792 (Okla. 1941); *W. Edmond Salt Water Disposal Ass'n v. Rosecrans*, 226 P.2d 965 (Okla. 1950)).

313. Anderson, *supra* note 260, at 233.

314. *Id.*

315. *Id.*

316. FPL Farming Ltd. v. Envtl. Processing Sys., L.C., 305 S.W.3d 739 (Tex. App. 2009), *rev'd*, 351 S.W.3d 306 (Tex. 2011).

317. *Id.* at 746.

318. *Id.* at 740-41.

EPS began operating the facility in 1996 under a permit.[319] However, during the permitting process, FPL's predecessor in title, J.M. Frost III, contested EPS's permit applications.[320] Ultimately, Frost reached a settlement with EPS for $185,000.00 and the parties reduced their agreement to writing, stating that the settlement was binding on all successors-in-title.[321] Thereafter, in 1999, EPS applied to amend its permit and FPL, now the surface owner, contested the permit.[322] An administrative law judge held that FPL did not have the right to exclude EPS from the deep surface although it was likely that wastewater would enter FPL's land.[323] It was further held that should wastewater enter FPL's land, FPL could seek damages from EPS at that time.[324] Three years later, FPL sued EPS alleging wastewater had migrated into the deep subsurface of its land and requested damages for trespass, negligence, and unjust enrichment.[325] The case resulted in a jury verdict for EPS on all claims and issues and the trial court entered a take-nothing verdict.[326]

Thereafter, a flurry of appeals took place. First, the Beaumont Court of Appeals affirmed, stating "no trespass occurs when fluids that were injected at deep levels are then alleged to have later migrated at those deep levels into the deep subsurface of nearby tracts."[327] *Next*, the Supreme Court of Texas reversed the Beaumont Court, and found that Texas laws governing injection well permits "do not shield permit holders from civil tort liability that may result from actions governed by the permit."[328] However, the Supreme Court did not decide whether owners of injection wells could be guilty of trespass if their injected fluids migrated onto other lands.[329] On remand, the Beaumont Court held:

> (1) Texas recognizes a common law trespass cause of action for deep subsurface water migration; (2) consent is an affirmative defense for trespass, on which EPS bore the burden of proof, and therefore the jury charge was improper; (3) FPL Farming was not entitled to a directed verdict because there was some

319. *Id.* at 741.
320. *Id.*
321. *Id.*
322. *Id.*
323. *Id.*
324. *Id.* at 742.
325. *Id.*
326. *Id.*
327. FPL Farming Ltd. v. Envtl. Processing Sys., L.C., 351 S.W.3d 306 (Tex. 2011).
328. *Id.* at 314.
329. *Id.*

> evidence that it (or Frost) impliedly consented to the subsurface entry; and (4) the trial court erroneously excluded the settlement agreement between EPS and Frost from evidence.[330]

Both parties appealed.[331] EPS challenged the decision recognizing a trespass cause of action and FPL challenged the decision affirming the denial of its motion for directed verdict and reversing the settlement agreement's exclusion.[332]

On February 6, 2015, nearly two years after the parties appealed to the Texas Supreme Court for a second time, a decision was issued. Many hoped that this long awaited decision would finally address whether Texas recognizes a trespass cause of action for deep subsurface wastewater migration. Disappointingly, the Texas Supreme Court entirely dodged that question and instead focused on whether lack of consent is an element of a trespass cause of action.[333] The Supreme Court stated, "Finally, any error in submitting the question of trespass for deep subsurface wastewater migration was harmless because the jury found no such liability, which obviates the need to address whether this is a viable cause of action in Texas."[334] Ultimately, the Texas Supreme Court reinstated the trial court's judgment and reversed the Beaumont Court of Appeals.[335] Almost six years after this landmark case was first filed, it concludes where it began and leaves unanswered the question of whether or not deep subsurface wastewater migration constitutes trespass.

V. Summary and Conclusion

The basic premise of pore space ownership is well rooted in the *ad coelum* doctrine. The idea of a fee simple ownership with the ability to convey certain "sticks" away from the bundle provides the most logical argument that pore space is a surface right if it has not been previously conveyed. This is further supported by the American Rule, which supports the premise that the surface owner owns the geological formation including the pore space so long as there have been no previous conveyances. Four of the states examined have passed statutes clarifying that pore space is owned by the overlying surface owner. These statutes reinforce the already

330. Envtl. Processing Sys., L.C. v. FPL Farming Ltd., No. 12-0905, 2015 WL 496336 at *2 (Tex. Feb. 6, 2015).
331. *Id.*
332. *Id.*
333. *Id.*
334. *Id.* at *10.
335. *Id.*

existing common law rights which award ownership to the surface estate. Six of the states examined have yet to pass statutes, but it appears all are leaning towards doing what the first four states have already done. Although Kentucky appears to have case law that leans towards awarding pore space to the mineral estate, it is highly likely that case law or statutes awarding pore space to the mineral estate will be challenged on constitutional grounds or that these laws will implement the Takings Clause.

However, what appears to be a victory for surface owners may pose a significant downside to environmentalists wanting to encourage CCS projects. There is a very strong argument to be made that when pore space is a private property right, as opposed to being government owned, that CCS projects become too cumbersome and costly to implement. Yet, in the event that pore space becomes a government owned property right, it is again likely that the Takings Clause will be implicated.

Additionally, oil and gas operators typically do not have the ability to use eminent domain to acquire private property rights for a non-public purpose. This principle, as it relates to pore space, poses a significant problem in the area of commercial wastewater disposal. Although there are only a few cases in this area, common sense says that when a commercial wastewater disposal operator only owns one acre and injects hundreds of thousands of barrels of wastewater into a wellbore on that one acre, the wastewater is migrating to an area outside of that one acre. It is likely, as pore space law develops, that surface owners may seek compensation from these commercial wastewater disposal operators or may even try to prohibit the injection. If this happens, it will result in increased prices for disposal of wastewater and could drive up the production costs in the oil and gas industry.

Finally, surface owners will need to protect their pore space or they may lose it. In *Ellis v. Arkansas Louisiana Gas Company*, the 10th Circuit reinforced the principles outlined in this paper with respect to a surface owner rights to the strata. However, the *Ellis* Court also ruled that the surface owners lost the underground storage rights because Arkansas Louisiana Gas Company had acquired a prescriptive easement. Based on this principle, it could be argued that there are surface owners losing pore space right now to those operating commercial wastewater disposal wells.

Clearly, pore space, as a natural resource, is central to the protection of the environment and the United States' energy independence which makes pore space a potential hotspot for litigation and policy in the coming years because it is the sole natural resource that must be utilized in order to move forward with CCS projects and wastewater disposal. As this happens, each

respective side, which includes not only the surface and mineral estates, but also the state and federal governments, will seek to protect their rights. As a result, it will be vital for policymakers, attorneys, and judges to proceed cautiously and have a sound understanding of the potential consequences that may develop as decisions are made surrounding pore space.

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