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Pore space ownership issues for CO₂ sequestration in the U.S.

Ian J. Duncan^{a*}, Scott Anderson^b, and Jean-Philippe Nicot^a

^a*Bureau of Economic Geology, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX 78713, USA*

^b*Environmental Defense Fund, Austin, TX, USA*

Abstract

Previous assertions that the ownership of subsurface pore space in states in the US under common law are divided into a majority following the American Rule (surface rights owner owns pore space) and a minority following the English Rule (mineral rights owner owns the pore space) are shown to be inconsistent with case law precedents traced back to 1861. The mineral estate is not likely to “own” the pore space or to have the right to use the pore space for purposes other than extracting minerals. The exception will be where the original fee simple owner sells the surface rights but reserves the subsurface mineral rights. In all other circumstances it is likely that courts will find that the surface owner also owns the pore space under common law.

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Keywords: legal issues, English common law, mineral rights, American rule

1. Introduction

In many countries of the European Union and their former colonies, all mineral rights are owned by the crown (federal governments). In the U.S. subsurface property rights are largely in private hands. The law concerning property rights is a basic concern of State rather than Federal law. A coherent law of property ownership in its modern form as derived from English common law, can be traced back to Lord Halsbury, Lord Chancellor of England (1895-1905). Halsbury’s Laws of England, asserts that “the ownership of land may be divided horizontally, vertically or otherwise either above or below the ground. Thus separate ownership may exist in strata of minerals, in the space occupied by a tunnel, or in different storeys of a building.” Common law property rights can be viewed as a bundle of rights that together define how ownership of the various resources are divided and defines limitations on the use of each by the owner. A typical bundle of rights might be: (1) surface rights; (2) rights to coal; (3) rights to natural gas; (4) rights to oil; (5) rights to minerals other than coal, oil, and gas (sometimes referred to as residual mineral ownership); and (6) additional unspecified rights to use the subsurface. The right to store CO₂ in pore space for long term sequestration is included in the last category of “additional unspecified rights”.

With the initiation of commercial CO₂ sequestration the nature of ownership of pore space has become the subject of intense interest. Stenhouse et al. [1] noted that “some entity owns the rights to these reservoirs” and that “since liability is a key issue to consider, it seems highly unlikely that the reservoir owner will not demand compensation”. Hendriks et al. [2] concluded that there is a need “to address ownership and responsibility issues for CO₂ stored within geological storage sites”. In a series of papers Mark De Figueiredo has proffered a comprehensive theory of pore space ownership in the context of CO₂ sequestration (De Figueiredo [3]; De Figueiredo [4]; and De Figueiredo et al. [5]). In these papers De Figueiredo argues that in the US states follow either the “American” or “English” Rules for ownership of geologic formations (or pore space). De Figueiredo [3] asserts that “In the majority of states, the owner of the surface interest owns the geologic formation” which he refers to as the American Rule. Wilson and De Figueiredo [6] assert that the English rule (which they suggest is also “practiced in much of Canada”) is where “the mineral owner owns the subsurface space even after the minerals have been removed”. The legal theory underpinning the English rule, as described by De Figueiredo [3] “assumes that the mineral owner does not take title to oil or gas until the

* Corresponding author. Tel.: +1-512-471-1534; fax: +1-512-471-0140.

E-mail address: ian.duncan@beg.utexas.edu.

owner reduces it to possession”. De Figueiredo [3] suggested that the English rule, holds in a minority of states in the US “but is law in Canada and England”. De Figueiredo’s analysis of pore space ownership has become widely referenced in talks and discussion papers on the legal issues associated with CO₂ sequestration.

In the current study we have reviewed a broad range of case law relevant to subsurface property rights. On the basis of this review we reject the classification of ownership described in De Figueiredo [3] [4], and De Figueiredo et al. [5]. We find that the courts’ application of basic common law principles is in fact consistent across all jurisdictions we have examined. While the question is not yet directly settled by case law in any common law jurisdiction, and while different jurisdictions may reach different results even in the face of similar facts, we believe that the basic approach courts will take to the pore space question is clear and that this approach will not differ significantly across jurisdictions.

2. Issues Related to Pore Space Ownership

The sequestration of CO₂ in deep brine reservoirs poses a novel set of questions regarding the nature of sub-surface property rights. A key question is whether the current legal regime for property rights is capable of addressing the range of issues posed by CO₂ sequestration in such a way that Carbon Capture and Storage (CCS) can proceed at an adequate pace to impact global CO₂ levels. For the owners of the surface and mineral rights overlying a deep CO₂ sequestration project a number of issues arise: (1) Can the rights to use of the pore space for different formations be sold to different entities? (2) If a corporation buys the pore space in a particular formation can it prevent the owner of oil or gas rights from breaching the overlying seal above the CO₂ reservoir? (3) If the pore space contains gas at levels currently uneconomic to produce can the owner of gas rights prevent the owner of the pore space from injecting CO₂? (5) If the owner of the pore space overlying an oil reservoir sells the sequestration rights does the owner of the oil rights have to be compensated for a resultant increase in costs to produce the oil? (7) Can the areas of ownership of the sub-surface pore space be aggregated in some way to enable a sequestration project to take place?

This article argues that the general approach to determining who owns pore space rights is relatively clear, but we do not discuss legal principles that might modify the general common law approach. We do not cover: (1) trespass cases that raise questions about when or whether a pore space owner might be able to successfully sue for damages; (2) eminent domain; (3) the extent to which government’s regulatory authority can regulate property rights without constituting a “taking;” (4) the precise extent of the mineral estate’s right to make reasonable use of pore space owned by the surface estate; (5) special doctrines that can be used to resolve conflicts between estates; (6) the possibility in some jurisdictions that pore space ownership could be subject to a “public trust” that limits rights that the pore space owner would otherwise possess; or (7) the possibility that the common law might evolve, much as it did to allow aircraft to fly through airspace once thought to belong to landowners, in a way that severs pore space from the control of the person who would otherwise have control under traditional principles. We hope to explore these issues in future work.

3. Legislative Action, Judicial Precedents, and Legal Commentary

Wyoming HB 89², which took effect July 1, 2008, declares that the ownership of subsurface pore space in the state (defined as “subsurface space which can be used as storage space for carbon dioxide or other substances”) generally is vested in the owners of the surface. A conveyance of surface ownership is a conveyance of pore space unless pore space ownership is explicitly excluded from the conveyance or the pore space previously has been severed from the surface ownership. A mineral conveyance does not transfer pore space ownership unless the agreement explicitly transfers such ownership. However, the bill provides that there is no change in common law relating to the dominance of the mineral estate. Thus, whether or not mineral owners own the pore space, they will continue to have certain rights to “use” the pore space (generally, the mineral estate has the right to use the surface estate as reasonably necessary to produce the minerals).

As is typical of common law issues the way forward is to look for analogies. De Figueiredo [3] asserts that “In the majority of states, the owner of the surface interest owns the geologic formation”. He cites the case of *Tate v. United Fuel Gas Co.*³ in West Virginia as exemplifying application of the American Rule. Tate had purchased the surface rights to the land, after the mineral rights had been severed including “oil, gas, and brine and all minerals, except coal underlying the surface of the land”, the deed included the term “mineral” but excluded “clay, sand, stone or surface minerals”. United Fuel Gas used the formation to store gas that had been produced elsewhere. Tate claimed that he owned the formations underlying the land. The court found that “the term ‘mineral’ is limited by the words of the instrument which separated the minerals from the other estate in the land. We are here dealing with an exception qualifying and limiting the meaning of the term ‘minerals’. We accordingly hold that the plaintiff is the owner of the clay, sand, and stone within the underlying the surface of the land in question”. The Justice opined that “mineral”

² HB 89 creates W.S. 34-1-152 and amends W.S. 34-1-202(e). Uncodified section 3 of the bill declares that the legislature simply intends to “clarify” pore space ownership. The clarification applies to conveyances made on or after July 1, 2008. It also applies to conveyances made prior to that date unless a person other than the surface owner establishes ownership by a preponderance of evidence.

³ *Tate v. United Fuel Gas Co.* 71 S.E.2d 65 (1952)

in the deed did not to include “clay, sand, stone or surface minerals” and that thus Tate owned the formation. The court also found the mineral rights excluded from the surface deed did not include the rights to store natural gas. This and other similar cases have been decided on narrow grounds and do not put forward a theory of subsurface ownership other than that they are retained by the fee simple owner unless specifically deeded to someone else.

De Figueiredo et al. [5] assert that “a minority of states [in the US] find that the mineral interest owner retains the exclusive use of the subsurface space”. De Figueiredo suggests that the issue of “ownership of the geological formation” was first addressed in the case *Central Kentucky Natural Gas v. Smallwood* (1952)⁴ and that this case is one of the first applications of the “English Rule” in the United States. The *Smallwood* case addressed the issue of the rights of the surface owner relative to the owner of the mineral rights in the context of a natural gas storage project. *Smallwood* (the owner of the surface rights) contended that the rent paid under a combined gas and gas storage lease should be paid solely to him. Despite the fact that the original gas reservoir was commercially depleted, Justice Duncan reasoned that because the stored natural gas is equivalent to “native” gas (and thus could be reduced to ownership until captured) only the mineral owner can authorize the production of the stored gas. This case contains no precedent for application of an English rule for pore space ownership. Justice Duncan states clearly that “In reaching the conclusion that we reach, it is not necessary to determine whether the cavern or strata from which a mineral has been removed becomes the property of the mineral or surface owner”. The opinion does offer by way of dicta that the “rule in England” is “that in the case of a grant of minerals under the land the grantee has the exclusive right of exclusive possession of the whole space containing the layer containing the minerals, and after the minerals are taken out, is entitled to the to the entire and exclusive use of this space for all purposes” However the opinion crafted by Justice Duncan clearly does not use this so called “rule in England” to support the *Smallwood* decision. In fact the next sentence in his opinion notes that “The general rule in the United States seems to be otherwise...”.

De Figueiredo [4], referencing Lyndon [7], stated that the English rule “is law [of property ownership] in Canada and England” as well as a minority of states in the US. De Figueiredo [3] [4] and De Figueiredo et al. [5] all refer to Lyndon [7] as the key source for the existence of the English Rule of pore space ownership. Similarly Wilson and Figueiredo [6] refer to the law review articles by Stamm [8] and Lyndon [7] as their source for their statements on the “English Rule”. Both Stamm [8] and Lyndon [7], like Justice Duncan in the *Smallwood* decision, point back to the same two English cases (*Bowser v. Maclean*, 1860⁵, and *Batten Pool v. Kennedy*, 1907⁶) as their source for the “English Rule”. So the question remains, what were the issues in these seminal English cases and how were they decided?

Both the cases in question were before the English Chancery Court. Both cases involved a split estate in which the original freehold owner of an estate had granted away surface rights but reserved the “coal veins and mines”. The issue at hand was whether the owner of the coal could both dig tunnels in strata other than the coal and use those tunnels to move coal from mines in adjacent estates. *Bowser v. Maclean* was a multifaceted review by the Lord Chancellor (Lord Campbell) of a lower court decision. Considering the earlier decisions, Lord Campbell was “inclined to think that a mistake has been committed in not distinguishing between a copyhold tenement with minerals under it, or a freehold land leased with a reservation of the minerals, or freehold land, where the surface belongs to one owner and the subsoil, containing the minerals, belongs to another as separate tenements divided from each other vertically, instead of laterally”. Lord Campbell determined that when the original freeholder of the land granted the surface to another party, excepting the mines “his intent was to reserve not just the mineral but rather the entire strata”. Thus, rather than being a decision that holds that surface owners do not own spaces left after the extraction of minerals, *Bowser* is simply a decision finding that a particular mineral reservation was worded in a way that reserved more than just the minerals.

In the closely related case, *Batten Pool v. Kennedy*, Justice Warrington (using the decision of *Bowser v. Maclean* as one precedent), determined that the reservation of “mines and veins of coal” in the original 1768 conveyance “unquestionably included not merely the bed of coal but the workings of the coal, and the cavity after the coal has been removed...”. The key to understanding these two cases properly (in our opinion) is that in both the cases, the original freehold (or fee simple) owner, in the view of the court, had effectively sold the surface rights to another party, but had retained the subsurface rights. This situation (again in our opinion and we think the opinion of Lord Campbell) is not the same as if the freehold owner had kept the surface and all other rights and had merely sold the right to mine the coal. Under these circumstances the property rights transferred would be limited by the exact terms of the deed or contract. We do not find in either of these decisions any basis for a general rule that the holder of the mineral rights inherently maintains ownership of the cavity or tunnels after the mineral has been removed.

⁴ *Central Kentucky Natural Gas Co. v. Smallwood*, 252 S.W.2d 866, 868 (Ky. 1952).

⁵ De Gex et al Reports of Cases Heard and Determined by the Lord Chancellor Vol. II, 415, 422 (1860)

⁶ Pollock et al Cases determined by the Chancery Division and in Lunacy Vol. I 256 269 (1907)

The issue of pore space ownership has so far been discussed by only a handful of commentators. While there is already an emerging opinion that favors the view that pore space rights generally belong to the surface owner, the underlying reason appears to be founded not on the idea that surface rights and pore space rights are inherently bound together, but rather on a recognition that as a historical matter fee simple estates have tended to retain the surface rights when carving out property interests to transfer to others and that fee simple owners have not tended to include pore space rights in the transfer instruments. Professor Owen Anderson states (regarding Texas law): “Surface owners have a stronger argument for ownership of pore spaces and hence subsurface CO₂ sequestration rights that are not related to EOR. Nevertheless, mineral owners, as holders of the dominant estate, have the right to explore for and produce oil, gas and minerals without unreasonable interference from the surface owner”.⁷ Similarly, discussing Texas law regarding the right to store natural gas, Professors Ernest Smith and Jacqueline Weaver state: “Unlike pressure maintenance and cycling operations, underground injections for storage purposes are not directly related to production. ... The right to store gas [where not directly related to mineral production] ... belongs more properly to the surface owner estate than the mineral estate”.⁸ In the context of natural gas storage, Professor Kuntz suggests that it would be prudent that “grants be secured from mineral owners of any separate strata not acquired whose rights of access might be impaired, from owners of various surface interests, and from owners of easements or other similar interests whose rights might be impaired in some way.”⁹ This advice might well be heeded by those entities contemplating developing deep brine sequestration projects. On behalf of the Interstate Oil and Gas Compact Commission, David Cooney reviewed cases from a number of states. He concluded that the law relating to ownership of pore space is unsettled. While recognizing that there are circumstances where mineral owners would have the right to use pore space even if the pore space is owned by the surface estate, Cooney advocated “clearly identifying the surface owner as the person with the right to lease pore space for storage, while protecting other stakeholders from potential damage attributable to sequestration activities.”¹⁰ On behalf of the New Mexico Energy, Minerals, and Natural Resources Department, Mark Fesmire, Adam Rankin, David Brooks and William Jones also reviewed relevant cases from a number of U.S. jurisdictions. While concluding that New Mexico common law regarding pore space ownership is “largely undeveloped” they also stated that several New Mexico cases indicate “preference” for what they view as “the majority view among states” that pore space belongs to the surface owner.¹¹

4. Discussion

We believe that jurisdictions grounded in English common law will generally determine that the surface owner owns the pore space. The reason for this, however, is not that the law recognizes something labeled “the” surface estate that inherently owns pore space rights. We reject the existence of an “American Rule” in which ownership of pore space is assigned to the owner of the surface rights. Courts in America and in other jurisdictions with a common law tradition will tend to find that the owners of surface estates own pore space rights because: (1) generally, 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 property interests out of the fee for transfer to others; (3) historically, 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 that explicitly identified. For example, legal documents creating mineral interests have typically used narrow language such as “oil, gas and other minerals” rather than broad language that would sever everything below the surface of the land and transfer it to a new owner. In the former case, the particular mineral interest created generally will have the right to use the pore space as reasonably necessary to extract minerals, but it is not likely to “own” the pore space or to have the right to use the pore space for purposes other than extracting minerals. The primary exception will be where the original fee simple owner sells surface rights but reserves subsurface rights. We believe that in such cases courts will likely follow the reasoning of Lord Campbell in *Bowser v. Maclean* and find that the surface owner does not own pore space rights (unless the reservation of subsurface rights is drawn very narrowly).

We believe that the principles set out above represent, not an “American Rule” as distinct from an “English Rule,” but an approach that will tend to be followed in all common law jurisdictions. It is not difficult to harmonize this view with English and American coal cases holding that mineral owners either own or have the right to use voids and tunnels dug out of the strata. Even in jurisdictions where courts have reached such results, we believe that courts will tend to view surface estates as the owner of pore space except to the extent the right to control pore space either has been granted away or has been reserved in an instrument

⁷ O. Anderson, “Geologic Sequestration: Who Owns the Pore Space?” (presented to University of Texas School of Law Carbon and Climate Change Conference, April 24, 2008). Anderson also provides a useful discussion of potentially influential precedents in Colorado, Kansas, Kentucky, Louisiana, Michigan, New Mexico, New York, Ohio, Oklahoma, West Virginia, and Wyoming.

⁸ E. Smith and J. Weaver, *TEXAS LAW OF OIL AND GAS* sec. 2.1.B.3 (2007).

⁹ E. Kuntz, *A Treatise on the Law of Oil and Gas* § 2.6(c) (1987).

¹⁰ Interstate Oil and Gas Compact Commission, *Storage of Carbon Dioxide in Geologic Structures – A Legal and Regulatory Guide for States and Provinces*, Part 1: Analysis of Property Rights Issues Related to Underground Space Used for Geologic Storage of Carbon Dioxide 22 (September 25, 2007).

¹¹ Fesmire et al, *A Blueprint for the Regulation of Geologic Sequestration of Carbon Dioxide in New Mexico* 18 (New Mexico Energy, Minerals and Natural Resources Department)(December 1 2007)

creating the surface estate. In addition, we believe that in virtually all common law jurisdictions established principles will tend to limit the surface owner's pore space rights (if any) by recognizing the right of mineral owners to make reasonable use of the surface estate for as necessary to produce minerals. In such cases, CO₂ storage projects are likely to need authorization from both mineral owners and surface owners assuming that the storage project is not necessary to, or lasts longer than, the mineral production efforts.

We believe that the issue of ownership can usually be readily determined if common law precepts and precedents are applied rationally. However a distinction must be made between ownership and rights to usage. These two concepts are distinct and can lead to differing legal interpretation. The right to produce minerals (be it oil, gas, coal or other minerals) carries certain rights to use the surface and sub-surface in order to secure these resources. In the US there is a rich history of case law in mineral producing states that address these usage rights. Based on this wealth of case law consents from the owners of mineral rights in addition to the owners of surface rights should probably be secured in for most sequestration projects to avoid litigation.

Another key question for a commercial CO₂ sequestration project is the extent of the pore space for which rights must be secured. We believe the safe course is to acquire, throughout the project footprint, all property rights that appear to be necessary for the project.¹² We consider the project footprint to include at least the full extent of the CO₂ plume and displaced brine, and quite possibly the zone of significantly elevated pressure.

Any state crafting legislation in an attempt to clarify the ownership of pore space should not (in our opinion) rely on the idea that there is an "American Rule" that surface owners necessarily own pore space rights. Such reliance could lead to an unconstitutional taking as to those who hold title derived from original fee-simple owners who sold their surface rights and retained sub-surface ownership.

5. Conclusion

Thus far, no court has specifically ruled on who owns pore space needed by a CO₂ sequestration project. Still, partly due to historical practice in the drafting of conveyances of real property and partly as a result of general common law principles that are well-established, it is likely that the surface owner generally will be found to own the pore space. The pore space ownership rights may well be limited in accordance with rights to use the pore space held by mineral owners. The nature and limitations posed by these mineral owner rights are also fairly well established by judicial precedent. In most, if not all, situations it will be prudent for the operators of CO₂ storage projects to not only acquire pore space sequestration rights from surface owners and also to secure rights to use the pore space from owners of mineral rights.

References

- [1] M. M. Stenhouse et al.: Regulatory issues associated with deep (geological) CO₂ storage. In: E.S. Rubin, D.W. Keith and C.F. Gilboy (eds.): Proceedings of 7th International Conference on Greenhouse Gas Control Technologies. Volume 1, UK: IEA Greenhouse Gas Programme (2004)
- [2] C. Hendriks, M. J. Mace, and R. Coenraads, Impacts of EU and international law on the implementation of carbon capture and geological storage in the European Union Report ECS04057, European Commission, Directorate General Environment (2005)
- [3] M. A. de Figueiredo, Property Interests and Liability of Geologic CO₂ Storage: A Special Report to the MIT Carbon Sequestration Initiative 9 (Sept. 2005).
- [4] M. A. de Figueiredo, The Liability of Carbon Dioxide Storage, Ph.D. Thesis, MIT Engineering Systems Division (2007).
- [5] M.A. de Figueiredo, H. J. Herzog, P. L. Joskow, K. A. Oye, and D. M. Reiner, Regulating Carbon Dioxide Capture and Storage MIT 07-003 (April 2007)
- [6] E. Wilson and M. de Figueiredo, Geologic Carbon dioxide Sequestration: An Analysis of Subsurface Property Law, 36 ELR 10114, 10123 (2006).
- [7] J. Lyndon, The Legal Aspects of Underground Storage of Natural Gas – Should Legislation Be Considered Before the Problem Arises? 1 Alberta L. Rev. 543, 545 (1961)
- [8] A. Stamm, Legal Problems in the Underground Storage of Natural Gas, 36 Tex. L. Rev. 161, 168 (1957)

¹² Interestingly, the Interstate Oil and Gas Compact Commission (IOGCC) has recommends that operators be required to hold "the necessary and sufficient property rights" for construction and operation of a CO₂ storage project, which is defined to encompass "the project in its entirety" including "all surface and subsurface infrastructure" and "the reservoir used" for injection and storage operations. IOGCC, Storage of Carbon Dioxide in Geologic Structures – A Legal and Regulatory Guide for States and Provinces. Model General Rules and Regulations. Sections 2.0 and 4.1(a) (September 25, 2007)