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Defining Pore Space Ownership and Related Issues: A Summary

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The issue of pore space ownership has come to the forefront of policy discussions in light of growing interest in hydrogen production and associated carbon capture and sequestration (CCS). Carbon capture and sequestration involves trapping carbon dioxide (CO₂) from a waste stream and injecting the CO₂ into the earth's subsurface—typically into the pore space of underground rocks. Pore space has two features: 1) an open void, which is surrounded by 2) a “container” around the open void. Underground rock forms this container. As West Virginia defines it, pore space is “a cavity or void, whether naturally or artificially created, in a subsurface stratum,” which creates a “container space or storage right.”²

Before injecting CO₂ into a subsurface layer, the injector must obtain two basic rights: a property right from the entity who owns the pore space, and regulatory permission—specifically, a federal Safe Drinking Water Act Class VI underground injection control (UIC) permit issued by the Environmental Protection Agency or a state environmental agency that has obtained “primacy” from the EPA. Operators of Class II UIC wells, which are wells for liquid brine waste from oil and gas operations, may also convert Class II wells to carbon sequestration wells.³ This type of conversion only requires a new Class VI permit if the conversion to a Class VI well poses “an increased risk to” underground sources of drinking water compared to the Class II well. The EPA provides a regulatory definition of increased risk.⁴

With respect to property rights, underground hard minerals, such as limestone, shale, coal, and similar minerals, and fugacious minerals such as oil and gas are owned by the surface owner.⁵ This is the *ad coelum* doctrine in U.S. law, which provides that the surface owner owns property from the heavens to the core of the earth. Surface owners may, however—and often do—sever off portions of their property (their “estate”). This severance creates a separate mineral and surface estate called a “split estate.” When severance of the mineral and surface estates occurs, this raises the question of who owns the pore space.

The vast majority of U.S. states provide that surface owners who have severed the mineral estate from the surface retain ownership of the pore space unless there is express language to the contrary in a conveyance or reservation (retention) of property. The surface owner does not possess full rights in the pore space, however, until the mineral owner has extracted the minerals (including

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² W. Va. Code § 22-11B-2 (2022).

³ 40 C.F.R. § 144.19 (2021).

⁴ *Id.*

⁵ The surface owner only owns the fugacious minerals, or the right to extract those minerals, as they sit beneath the surface. If another legally-drilled well on another property drains away those minerals, the surface owner is not owed damages due to the rule of capture.

the opportunity for secondary and tertiary operations). This is called the American rule. States have established this rule through court decisions or legislation or both.

American rule examples:

Michigan: “[A] surface owner possesses the right to the storage space created after the evacuation of underground minerals or gas. While defendants [oil and gas company] may, of course, ‘store’ any fluid minerals or gas native to the chamber that has not yet been extracted, they cannot introduce any foreign or extraneous minerals or gas into the chamber. Only the surface owner . . . possesses the right to use the cavern for storage of foreign minerals or gas, and then only after defendants have extracted the native gas from the cavern.” *Dept. of Transp. v. Goike*, 220 Mich. App. 614, 617 (1996).

Montana: Pore space “belongs to . . . surface estate in the same manner that all non-mineral material” beneath property belongs to the surface. *Burlington Res. Oil & Gas Co. LP v. Lang & Sons Inc.*, 361 Mont. 407, 412 (2011).

New York: “While a grant of production rights will include the right to conduct all operations necessary to extract those minerals, such a grant alone cannot be construed to include the right to store gas piped in from foreign fields.” *Miles v. Home Gas Co.*, 35 A.D.2d 1042, 1043 (N.Y. App. Div. 1970).

Oklahoma: “It 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.” A mineral “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.” And highlighting a practical reason for the American rule: “If this court had concluded that 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.” *Ellis v. Arkansas Louisiana Gas Co.*, 450 F.Supp. 412, 421-22 (E.D. Okla. 1978). (See also Oklahoma’s legislative definition of pore space ownership.)

Pennsylvania likely follows the American rule. “[T]he grant of coal is the grant of a right to remove it.” “When the coal is all removed, the [mineral] estate ends. . . .*The space it occupied reverts to the grantor [surface owner].*” “It cannot be seriously contended that, after the coal is removed, the owner of the surface may not utilize the space it had occupied for his own purposes” *Chartiers Block Coal Co. v. Mellon*, 152 Pa. 286, 296-97 (1893).

The [mineral owners’] interest in the space occupied by the minerals *is not perpetual*; rather, the mineral owner’s interest in the space is ‘in the nature of an estate determinable, which *reverts to the surface landowner* by operation of law at some time subsequent to the removal of the’ minerals.” *EXCO Resources (PA), LLC v. New Forestry, LLC*, No. 1:10-cv-1793, 2012 WL 3043008, at *3 (M.D. Pa. July 25, 2012), quoting *U.S. Steel Corp. v. Hoge*, 468 A.2d 1330, 1384 (Pa. 1983) (emphasis added by author).

“The right to extract gas did not include the right to use the cavernous spaces owned by the lessor [surface owner] for the storage of gas in the absence of an express agreement therefor.” *Pomposini v. T.W. Phillips Oil & Gas Co.*, 397 Pa. Super. 564, 569 (1990).

Texas has recently leaned toward the American rule: *Lightning Oil Co. v. Anadarko E & P Onshore L.L.C.*, 480 S.W.3d 628, 635-36 (Tex. App. 2015): “. . . Lightning [the oil and gas company] does not own or exclusively control the earth surrounding any hydrocarbon molecules that may lie within the boundaries of the Cutlass Lease.” “[A]bsent the grant of a right to control the subterranean structures in which the oil and gas molecules are held, the mineral estate owner does not control ‘the mass that undergirds the surface of the [conveyed land].’” (quoting *Dunn–McC Campbell Royalty Interest, Inc. v. Nat’l Park Serv.*, 630 F.3d 431, 442 (5th Cir. 2011)).

Emeny v. United States, 188 Ct. Cl. 1024, 1032 (1969): In helium storage context, surface owner owns “geological structures beneath the surface, including any such structure that might be suitable for the underground storage of ‘foreign’ or ‘extraneous’ gas produced elsewhere” (cited with approval in *Springer Ranch, Ltd. v. Jones*, 421 S.W.3d 273, 283 (Tex. Ct. App.—San Antonio, 2013)).

State legislation codifying the American rule—examples:

State	Statutory language
Indiana Code § 14-39-2-3	For split estate, “[a]fter June 30, 2022, the ownership of pore space is vested in the surface estate” unless express conveyance to contrary
Kentucky Rev. Stat. Ann. § 353.800	“ ‘Pore space owner’ means the surface owner . . . ”
Nebraska Rev. Stat. § 57-1604	Surface owner unless reservoir estate (containing underground voids/cavities) “has been severed and separately conveyed”
North Dakota Cent. Code § 47-31-03	“Title to pore space in all strata underlying the surface . . . is vested in the owner of the overlying surface estate.”
Oklahoma Stat. tit. 60 § 6	“Land is the solid material of the earth, . . . and includes any pore space.”
Utah Code Ann. § 40-6-20.5	“Title to pore space underlying the surface estate is vested in the owner of the surface estate.”
West Virginia Code Ann. § 22-11B-18	“Title to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate.”
Wyoming Stat. Ann. § 34-1-152	“The ownership of all pore space in all strata below the surface lands and waters of this state is . . . vested in the several owners of the surface above the strata.”

Alaska appears to be the only U.S. state that expressly follows the English rule. The English rule provides that the mineral owner owns the pore space. *City of Kenai v. Cook Inlet Natural Gas Storage Alaska, LLC*, 373 P.3d 473 (Alaska 2016).

Additional property questions related to CO₂ sequestration include, *inter alia*:

1) If the surface owner owns the pore space, may the surface owner sever off and separately convey the pore space from the surface?

In North Dakota, state legislation specifies that a surface owner may not permanently sever the pore space from the surface but may separately *lease* the pore space. This allows the surface owner to retain the surface estate while also enabling carbon sequestration by a separate company operating beneath the surface.⁶

2) If the surface owner owns the pore space and there are two competing underground uses for pore space, who prevails—the entity injecting CO₂, or the other use? (Example—oil and gas driller wants to drill down through pore space to reach a formation below.)

In nearly all states (including Pennsylvania), the mineral estate is dominant over the surface estate, with several legislative exceptions. Under the court-created reasonable use doctrine, the mineral owner may use surface property as is reasonably necessary to produce minerals and need not compensate the surface owner for damages caused by reasonable use of the surface. But the answer to the issue of mineral use of pore space versus carbon sequestration use of pore space partially rests on when the CO₂ pore space use began. If an entity began injecting CO₂ before an oil and gas producer attempts to use the pores—say, to drill a well through the pores and access oil and gas below—the accommodation doctrine applies in some states. The accommodation doctrine provides that if a surface owner had begun a surface use before oil and gas extraction began, and the surface owner can show a reasonable alternative to extraction that would not damage the surface use, the oil and gas company must employ that reasonable alternative. *Getty Oil Co. v. Jones*, 470 S.W.2d 618 (Tex. 1971).

Pennsylvania courts have not yet determined whether Pennsylvania follows the accommodation doctrine. However, one recent federal case in Pennsylvania shows that when the Federal Energy Regulatory Commission grants eminent domain authority to a natural gas storage company, the underground space acquired through eminent domain is off limits to all oil and gas extraction. This area that is off-limits to extraction includes the “buffer zone” around the natural gas storage area, where natural gas is not injected but additional property is acquired to prevent other underground activities from intruding into or endangering the integrity of the storage reservoir:

When certificating interstate natural gas storage today, it is typical for the Commission to approve buffer zones in order to protect the integrity of the storage facility. The [Federal Energy Regulatory] Commission believes, absent evidence to the contrary, that it is important that storage fields **have a buffer zone to protect the integrity of the storage field, especially in areas, as here, where intensive natural gas production activities are possible.** The Commission also believes that there is a real possibility that drilling and completion activities in the vicinity of the Sabinsville Pool

⁶ N.D. Cent. Code §§ 47-31-05, 47-31-06.

could have a detrimental affect on its integrity. Dominion has a responsibility to protect the natural gas that its customers have entrusted to it to store for them in the Sabinsville Pool and a responsibility to maintain the integrity of the storage reservoir.⁷

At least one state, however, expressly allows oil and gas drilling through CO₂ sequestration facilities if the drilling does not interfere with the sequestration facilities. *See* W. Va. Code, § 22-11B-9:

Nothing in this article shall be deemed to affect the otherwise lawful right of a mineral owner to drill or bore through a carbon dioxide storage facility if done in accordance with the secretary's underground injection control permit rules or any other applicable legal requirements which are intended to protect the carbon dioxide storage facility against the escape of carbon dioxide.

3) May CO₂ sequestration companies acquire pore space through eminent domain (full acquisition of property, with no landowner consent needed) or compulsory pooling (acquisition of property from non-consenting owners after a certain percentage of owners in the area of the proposed sequestration reservoir have consented to lease)?

In some states, such as Oklahoma and Wyoming, CO₂ sequestration companies may not use eminent domain. Okla. Stat. tit. 27A § 3-5-106; Wyo. Stat. Ann. § 35-11-316.

Examples of states that allow compulsory pooling for CO₂ sequestration

State	Statutory language
Kentucky Rev. Stat. § 353.806	Compulsory pooling after “51% of the interest in the pore space for the storage facility” has been acquired (after good faith negotiation).
Nebraska Rev. Stat. § 57-1612	“If a storage operator does not obtain the consent of all persons who own a reservoir estate within the storage reservoir, the commission may require that any reservoir estates owned by nonconsenting owners be included in a storage facility and subject to geologic storage.”
North Dakota Cent. Code § 38-22-10	“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

⁷ Dominion Transmission, Inc., 141 FERC P 61183 (2012).

	nonconsenting owners be included in a storage facility and subject to geologic storage.”
West Virginia Code Ann. § 22-11B-19	Compulsory pooling after “75 percent of the interests in the pore space of the tract” have been acquired (after good faith negotiation).

4) When a carbon sequestration company is obtaining underground pore space for a proposed sequestration reservoir, what if the owners of some of the pore space cannot be identified?

Some states allow the company to place money in a trust fund in the event that the owners are later identified. This allows the company to move forward with the project and obtain needed property even when the owners cannot be identified. *See, e.g.,* W. Va. Code, § 22-11B-20: “The storage operator shall hold all funds of unknown or unlocatable owners in trust in an interest bearing account and shall transfer said funds as unclaimed property to the State Treasurer”

5) After the injector injects CO₂, who owns it and is liable for the CO₂ if it escapes?

Many states are likely to decide this issue on the basis of court decisions addressing natural gas that was injected into storage and migrated off site, or brine that was injected into a Class II well and migrated off site. Several states indicate that migrating brine is still owned by the injector and causes a trespass, but typically only if actual damage to underground property is shown. *See, e.g., Chance v. BP Chemicals, Inc.*, Nos. 66622,66645, & 67369, 1995 WL 143827 (Ohio App. 8d Mar. 30, 1995) (not reported in N.E.2d) (non-native brine that migrated to another property could be a trespass but would only be actionable if actual damages were shown); *Tidewater Oil Co. v. Jackson*, 320 F.2d 157 (10th Cir. 1963); *FPL Farming, Ltd. v. Envtl. Processing Systems, L.C.*, 351 S.W.3d 306 (Tex. 2011); *Snyder Ranches, Inc. v. Oil Conservation Comm’n*, 110 N.M. 637, 798 P.2d 587, 590 (1990).

North Dakota provides that “carbon dioxide stored, *and which remains in storage* under a commission permit, is not a pollutant nor does it constitute a nuisance.” N.D. Cent. Code § 38-22-12 (emphasis added). The code further provides that “[w]hile the storage operator holds title, the operator is liable for any damage the carbon dioxide may cause, including damage caused by carbon dioxide that escapes from the storage facility.” N.D. Cent. Code § 38-22-16. Oklahoma similarly specifies that injected CO₂ remains the personal property of the injector and does not become the property of the surface owner or mineral owner unless there is “a final judgment of willful abandonment rendered by a court of competent jurisdiction.” Okla. Stat. tit. 27A § 3-5-105.

West Virginia Annotated Code § 22-11B-11 provides that the injector owns CO₂ and is liable until a Certificate of Underground Carbon Dioxide Storage Project Completion is issued by the Secretary of the West Virginia Department of Environmental Protection, with issuance allowed 10 or more years after CO₂ injections end.

Also related to liability: The EPA has specified that sequestered CO₂ is not a hazardous waste provided that it is handled under EPA-listed conditions. *See* Hazardous Waste Management System: Conditional Exclusion for Carbon Dioxide (CO₂) Streams in Geologic Sequestration Activities Rule, 79 Fed. Reg. 350 (Jan. 3, 2014).