Chapter 4

Who Owns the Heat? Navigating Pennsylvania's Geothermal Property Rights

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Principles for addressing the ownership of geothermal resources and the rights of property owners can be derived from well-established rules developed over the years in Pennsylvania property law—particularly related to oil and gas, coal mining, and water extraction. This should mean that, regarding ownership, geothermal projects in the Commonwealth should be able to move forward without additional legislative action.

INTRODUCTION

As geothermal energy becomes more widely used, questions of who owns the resources associated with geothermal energy—heat, water, steam, and pores in the earth—will become increasingly important. Although no Pennsylvania court has yet addressed these questions, or even mentioned the term "geothermal" in a published decision,[1] established principles of deed interpretation, the Dunham Rule, and other Pennsylvania case law and statutes support the conclusion that geothermal energy and the resources required to harness it are owned by the surface owner of real property (unless a deed or other conveyance dictates the contrary). Because ownership of resources associated with geothermal energy can be derived from existing Pennsylvania law, geothermal projects in the Commonwealth should be able to move forward without waiting for further clarification or change in state law on the issue. This gives Pennsylvania an advantage over some states which require legislative changes to clarify heat ownership.

FOUNDATIONAL CONCEPTS OF PROPERTY OWNERSHIP IN PENNSYLVANIA

Deed Interpretation: How Do We Know Who Owns What?

When a grantor conveys a parcel of land to a grantee, the language of the deed determines who owns the land and what interests the deed conveys.[2] The courts look to establish the meaning of the words in the deed by reference to the deed itself, taking all of the language in the deed together.[3] In other words, the courts look to the intention of the parties to determine what the deed means.[4] Pennsylvania courts have applied these principles when interpreting deeds that transfer subsurface resources, such as coal, natural gas, and oil.[5]

Ownership of the Land: Three Estates in One Parcel

In Pennsylvania, an owner of land owns her property "from the center to the surface, and from the surface to the heavens."[6] This is known as the *ad coelum* doctrine, and it is an ancient and widely followed principle of property law.[7]

Although the default rule under the *ad coelum* doctrine is that one owner owns the surface and subsurface of a parcel, a property owner's parcel can be divided into three distinct components: the surface estate, the subsurface or mineral estate, and the right of subjacent (surface) support.[8] Different people can own each part separately, in the same parcel of land.[9] If the three estates are not explicitly divided, then the owner of the property automatically owns all three estates.[10]

The surface estate is, fairly clearly, just the surface of the Earth. The subsurface estate, or the mineral estate, includes everything below the surface. Pennsylvania courts use *mineral estate* or even *coal estate* interchangeably with the term *subsurface estate*.[11] The subsurface estate can be further subdivided into smaller interests.[12] For example, the owner of a parcel of land could sell the coal rights to one owner and then sell the natural gas and oil rights to another.[13] Those portions of the subsurface estate that have not been specifically severed from the surface estate belong to the owner of the surface estate.

The right of subjacent support is not an estate in the same way that the subsurface and surface estates are. Instead, it means that the surface owner has a right to insist that the subsurface owner not damage the surface by causing subsidence. This is consistent with the general principle that each owner must enjoy their property without harming the other's property.[14] A person can also waive the right of support when severing the surface and subsurface estates, although this should be done expressly.[15] The right of subjacent support can be relevant in the geothermal context where, depending on the geological features and the geothermal technology deployed, use or withdrawal of significant amounts of water can cause the land surface to subside.[16]

Ownership of Fugitive Resources: The Relationship with Adjoining Parcels

The general principle of *ad coelum* does not apply to so-called fugitive resources such as oil, gas, and groundwater that can pass underground from one parcel to another. Pennsylvania courts characterize these resources as minerals *feroe naturoe*—those that "have the power and the tendency to escape without the volition of the owner."[17] Subsurface oil, gas, or water are in theory owned by the surface owner of the parcel under which the resource is resting, or the owner of the relevant subsurface estate.[18] However, once those resources travel to another piece of property, they belong to the owner of that parcel.[19] Ownership of the fugitive resource is only fully established when it comes under someone's control, such as when it is pumped to the surface from a well.[20] In other words, "if an adjoining, or even a distant, owner drills his own land, and taps your gas, so that it comes into his well and under his control, it is no longer yours, but his."[21] This is known as the *rule of capture*.[22]

The rule of capture is potentially relevant to the ownership of geothermal resources. For example, if a property owner extracts subsurface water from under their property to harness geothermal energy, and thereby reduces the water under a neighbor's property,

the property owner actively extracting the water would be seen as the owner of the subsurface water.

The Meaning of Owning "Minerals": The Dunham Rule

As noted, the language of a deed is all-important in estate rights. Many subsurface deeds or leases convey the rights to minerals, thereby generating disputes over what falls within the category of minerals. In the majority of states, courts define minerals to include all inorganic substances for which mining or drilling is commercially profitable.[23] Pennsylvania, however, takes a different approach, known as the Dunham Rule, from the 1882 Pennsylvania Supreme Court case of *Dunham v. Kirkpatrick*.[24]

Dunham involved a dispute between the owner of the surface estate—Kirkpatrick—and the owner of the mineral estate of the parcel—Dunham.[25] The pertinent clause in the deed gave the mineral estate owner rights to "all minerals."[26] When the owner of the mineral estate entered the parcel and began to drill for oil, the surface owner objected.[27]

The Pennsylvania Supreme Court held that the term minerals as used in the deed did not include oil.[28] Instead, the court reasoned that, although oil would be included in the most comprehensive meaning of the term, the court's job was to interpret the deed based upon the parties' intention in drafting the deed.[29] The parties did not intend a broad, scientific meaning of minerals because normal laypeople would understand the term to mean a metallic substance.[30]

In support of its reasoning, *Dunham* cited the earlier case of *Gibson v. Tyson*.[31] In that case, a deed had granted the rights to "all mineral or magnesia of any kind" in a subsurface estate.[32] The Pennsylvania Supreme Court held that the term mineral should be construed in its "ordinary" sense, as it is employed in "general and popular use," and that in this use the term meant "ores and other metallic substances found beneath the surface of the earth, and all other substances which are the object of mining operations."[33] Applying *Gibson*, the *Dunham* court concluded that, absent clear and convincing evidence showing the parties' intentions to the contrary, the term minerals does not include oil.[34]

Subsequent Pennsylvania cases have reaffirmed *Dunham*, despite its unpopularity in other states.[35] In the 1960 case of *Highland v. Commonwealth*,[36] the Pennsylvania Supreme Court held that the Dunham Rule creates a strong presumption that an interest in subsurface "minerals" does not implicitly include oil or natural gas.[37] The 2013 case of *Butler v. Charles Powers Estate ex rel. Warren* again reaffirmed *Dunham*, finding that the owners of "minerals" did not also own the shale gas.[38]

In repeatedly rejecting bids to limit or overrule the Dunham Rule, the Pennsylvania Supreme Court has reaffirmed that "the common, layperson understanding of what is and is not a mineral is the only acceptable construction of a private deed."[39] Thus, a long line of cases supports the ongoing vitality of the Dunham Rule in Pennsylvania. As applied to deeds and leases that convey a right to subsurface minerals, the meaning of the rule is relatively clear: deeds or leases should be construed as they would be understood by those negotiating them, and substances not specifically identified or contemplated in the deed or lease should be presumed to have not been conveyed (and are thus owned by the surface owner).

As applied to geothermal resources, the Dunham Rule seems to support the rights of the surface owner as opposed to an owner of the subsurface estate, in the absence of specific language to the contrary in the deed or lease. This is because a deed for a traditional subsurface resource such as oil, gas, coal, or minerals was almost certainly not intended to include the rights to geothermal resources such as heat, steam, or water. In other words, if parties intend to convey the rights to geothermal resources, they should explicitly name those resources in the conveyance.

Ownership of Pore Space

There are no cases in Pennsylvania that address the ownership of pore space.[40] However, case law does provide some reasoning relevant to the issue of title over pore space in the Commonwealth. In the 1990 Superior Court case of *Pomposini v. T.W Phillips Gas & Oil Co.*,[41] a lessee was conveyed rights for drilling and operating for oil and gas, but for twenty-seven years, they were using the land primarily for storage of gas.[42] The court had to interpret the deed to determine whether the lessee had misused the lease.[43] The court determined that, because the lease only conveyed the ability to drill and operate, "the right to extract gas did not include the right to use the cavernous spaces owned by the lessor for the storage of gas in the absence of an express agreement."[44]

Then, in the 2012 federal district court case of *EXCO Resources, LLC v. New Forestry, LLC*,[45] New Forestry owned a surface estate, under which EXCO owned the oil and gas rights via a deed that severed all "rights, titles, and interests in and to all of the oil and gas ... and the space occupied thereby."[46] The issue presented was "whether EXCO's ownership rights permit[ted] it to dispose of liquid waste from fracking operations beneath New Forestry's land" in the space once occupied by oil and gas.[47] The court acknowledged that the owner of the oil and gas rights has an interest in the space occupied by the oil and gas, but reasoned that a plain reading of the deed showed that the parties did not intend for the oil and gas rights owner also to have rights to use the subsurface space for waste fluid disposal.[48]

As this paper was being completed, the Pennsylvania General Assembly gave even more support to those past rulings: Act 87 explicitly gives surface owners the ownership of pore space "unless the agreement expressly includes conveyance of the pore space."[49]

RELEVANT PRINCIPLES RELATED TO USE OF PROPERTY

The Implied Right of Use

Conflicts between mineral owners and surface owners are common.[50] The entity who has the rights to the subsurface of a piece of land has, implicit in the grant of subsurface rights, the right to use the surface for "reasonably necessary" operations.[51] But when using the surface land, the subsurface owner must exercise "due regard" for the surface.[52]

These rights are implicit; they don't have to be spelled out in a deed or lease. Nevertheless, many subsurface deeds and leases do contain language expressly giving the subsurface rights holder the right to use

the surface to the extent that such use is "necessary" or "convenient" to the extraction of the subsurface resources.[53]

Just as the subsurface estate owner has the right to use the surface to access the subsurface, the surface owner (or an owner of another subsurface estate) has the right to use other aspects of the subsurface to reach their property (see *Chartiers Block Coal Company v. Mellon*).[54]

For geothermal energy purposes, this would mean that, if a property owner had conveyed the coal rights or natural gas rights to another party, then the property owner—or their grantee or lessee of the rights to the geothermal resources—would still have the right to go through those resources to reach the heat, water, or other resources needed for geothermal energy. As described below, however, this right would potentially be subject to restrictions to protect against harm to the coal or natural gas resource.

Interference with Use

The courts have not resolved all questions about the relationship between owners of different estates when it comes to implied rights to subsurface resources. Harmonizing relationships among owners of different estates on the same lands requires principles that enable access but also protect against interference. The same is true regarding relationships between owners of subsurface rights and owners of rights on nearby parcels.

In general, when different estates on the same land are separate, the owners of each estate must try to prevent wanton interference with the other's estate.[55] This rule is similar, in a sense, to the right of support and the implied right of use described earlier in this chapter. The owner of an estate must enjoy her rights in such a way that it does not interfere with the lawful exercise of the rights of the owners of other rights in the same land.[56] For example, the court has held that a surface owner has every right to the portion of the estate underlying another subsurface interest—say coal strata—conveyed to another, but he has to exercise his right to that portion without causing damage to the coal strata.[57] If he did cause harm, the coal rights owner would be entitled to damages, though the court left open the question of what limitations may be necessary.[58]

Pennsylvania cases have not resolved the question of what claims different subsurface rights holders have against one another when one's extraction activities hinder another's. Presumably, a subsurface rights holder is not strictly liable when its activities to extract its resources cause damage to other subsurface resources, just as a subsurface rights holder is not strictly liable for any damage it causes to the surface.[59]

Similarly, concerns may arise with one parcel owner interfering with the rights of the owner of another adjacent or nearby parcel. Pennsylvania courts, for instance, have long addressed disputes between adjoining property owners upset about the disruption of their underground water supplies. In deciding such cases, the courts have held that acts by adjoining owners can damage, or even destroy, a spring that depends upon filtrations and percolating waters underneath and through their lands without liability, so long as the interference is not malicious or negligent.[60] An adjoining landowner would, however, be liable for interference caused by an "ultrahazardous activity," such as blasting rock.[61]

In the 2020 case of *Briggs v. Southwestern Energy Production Company*,[62] the Pennsylvania Supreme Court addressed the issue of interference in the context of hydraulic fracturing. The court applied the rule of capture to hydraulic fracturing, holding that a plaintiff alleging trespass due to the drainage of gas from underneath their property must allege that the defendant physically invaded the subsurface of the plaintiff's property.[63] On remand, the Superior Court held that "the propulsion of fracturing fluid and proppants into an adjoining property can constitute a physical intrusion." In other words, that would be a trespass.[64]

Some geothermal systems use hydraulic fracturing to help collect geothermal heat from subsurface rock formations that would otherwise be impermeable or poorly permeable. Geothermal systems also often inject water underground to be heated and then extracted. It appears, based on *Briggs*, that Pennsylvania courts would likely hold that propelling fluids under

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a neighboring parcel for the purpose of geothermal resource development would constitute a trespass if done without permission. Merely extracting groundwater or heat from underneath a neighboring parcel, however, would not create liability, at least where (a) no equipment extends underneath the neighboring parcel and no fluids are propelled underneath the neighboring parcel;[65] and (b) the extraction is not malicious or negligent. It is unlikely that geothermal energy development would be considered an ultrahazardous activity, because drilling down to harness the energy of steam and water is not at all similar to blasting rock.

CONCLUSION

Although the Commonwealth's courts have not yet interpreted a deed in the context of geothermal energy and its associated resources, principles for addressing the ownership of geothermal resources and the rights of property owners can be derived from well-established rules developed over the years in Pennsylvania property law—particularly related to oil and gas, coal mining, and water extraction. First, geothermal resources generally will belong to the surface owner, unless a deed or lease says differently. Second, owners of geothermal resources will have the right to cross other surface and subsurface parts of the property to access the resources, but they are obligated to avoid unnecessary damage to those other estates. Finally, owners of geothermal resources will have the right to extract heat, water, and steam from underneath adjoining parcels but must avoid physically intruding under the surface of those other parcels without permission. These settled principles should mean that geothermal projects in the Commonwealth can move forward without any additional action from the legislature regarding ownership of subsurface resources associated with geothermal energy.

CHAPTER REFERENCES

1 Pennsylvania has four separate statutes that mention "geothermal energy." It is included in the definition of "renewable energy source" in the Municipalities Planning Code, 53 Pa. Cons. Stat. § 10107; in the definition of "renewable resource" in the Public Utility Code, 66 Pa. Cons. Stat. § 2803; in the definition of "energy producing facilities" in the Economic Development Financing Law, 73 Pa. Cons. Stat. § 373; and in its own right as an "alternative energy source" in the Alternative Energy Portfolio Standards Act, which defines it as "electricity produced by extracting hot water or steam from geothermal reserves in the earth's crust and supplied to steam turbines that drive generators to produce electricity," 73 Pa. Cons. Stat. § 1648.2.

2 *See Highland v. Commonwealth*, 161 A.2d 390, 402 (Pa. 1960).

3 *Id.*

4 *See Butler v. Charles Powers Estate ex rel. Warren*, 65 A.3d 885, 891 (Pa. 2013).

5 *Id.; see also Highland*, 161 A.2d 390.

6 *Algonquin Coal Co. v. Northern Coal & Iron Co.*, 29 A. 402, 403 (Pa. 1894).

7 *See U.S. v. Causby*, 328 U.S. 256, 260 (1946); see also *Algonquin Coal*, 29 A. at 403. The one exception, perhaps, to the *ad coelum* doctrine in the modern world is the airspace above one's land. See *Causby*, 328 U.S. at 260 (stating that, in the modern world, owning one's land "to the heavens" was not practicable when Congress had declared the airways a public highway). This limitation, while important generally, has not been extended past airspace and so is not particularly relevant to geothermal energy and subsurface resources. Moreover, even as to airspace, the surface owner has some ownership rights. Cf. Tiffany Real Property § 583 (noting that "[w]hether the owner of the land ... actually owns the air space above the land ... is a question of difficulty").

8 *See Penn. Services Corp. v. Texas Eastern*, 98 A.3d 624, 629 (Pa. Super. 2014).

9 *Id.*

10 *See Algonquin Coal*, 29 A. at 403.

11 *See, e.g., U.S. Steel v. Hoge*, 468 A.2d 1380, 1384 (Pa. 1983).

12 *See, e.g., Hetrick v. Apollo Gas Co.*, 608 A.2d 1074, 1077-8 (Pa. Super. 1992).

13 *Id.* Once the subsurface estate has been severed from the surface estate, adverse possession of the surface estate does not acquire title to the subsurface estate, although adverse possession of the subsurface estate can take title to the subsurface. *See Delaware & Hudson Canal Co. v. Hughes*, 38 A. 568, 569 (Pa. 1897).

14 *See Carlin v. Chappel*, 101 Pa. 348, 352 (1882).

15 *Walter v. Forcey*, 151 A.2d 601, 605 (Pa. 1959).

16 See Anthony Mossop & Paul Segall, *Subsidence at The Geysers Geothermal Field, N. California from a Comparison of GPA and Leveling Surveys*, 24 Geophysical Research Letters 1839 (1997).

17 *See Westmoreland & Cambria Nat. Gas Co. v. De Witt*, 18 A. 724, 725 (Pa. 1889).

18 *See Briggs v. Southwestern Energy Prod. Co.*, 224 A.3d 334, 336 (Pa. 2020).

19 *See id.*

20 *Westmoreland*, 18 A. at 725.

21 *Id.*

22 *See Briggs*, 224 A.3d at 336; *see also* Keith B. Hall, *Ruminations on the Continuing Evolution of Trespass Law in the Context of Mineral Development*, 8 LSU J. Energy L. & Resources 505, 536 (2020) (noting that "the rule of capture has been universally adopted" in the United States).

23 *See* Mark T. Wilhelm, *"All" Is Not Everything: The Pennsylvania Supreme Court's Restriction of Natural Gas Conveyances in* Butler v. Charles Powers Estate ex rel. Warren, 59 Vill. L. Rev. 375, 385 (2014).

24 101 Pa. 36, 43 (1882).

25 *See id.* at 37.

26 *Id.*

27 *Id.*

28 *Id*.
29 *Id*. at 44.
30 *Id*.
31 5 Watts 34, 41-42 (Pa. 1836)
32 *See id*. at 34.
33 *Id*. at 38.
34 101 Pa. at 44.
35 *See, e.g., Dye v. CNX Gas Co.*, LLC, 291 Va. 319, 325 (2016)(noting that *Dunham* represents the "minority rule").
36 161 A.2d 390 (Pa. 1960).
37 Pennsylvania courts also have applied the *Dunham* rule to conveyances of "other minerals." See, e.g., *Winnett v. Winnett*, 39 Pa. C.C. 668, 672 (Pa. Com. Pl. 1912)(construing a grant of a specific vein of coal "and all other minerals" to include other coal veins but not oil and gas). The Pennsylvania Supreme Court has also applied *Dunham* and its progeny to a deed's reservation of the right to drill for "gas", finding that it does not apply to coalbed methane, since at the time the deed was written, coalbed gas was generally viewed as a dangerous waste product of coal mining, so the parties negotiating the deed would not have intended to include it within the reservation. *See U.S. Steel v. Hoge*, 468 A.2d 1380 (Pa. 1983).
38 *See id*.
39 *Id*. at 888; *see also id*. ("Notwithstanding different interpretations proffered by other jurisdictions, the rule in Pennsylvania is that natural gas and oil simply are not minerals because they are not of a metallic nature, as the common person would understand minerals.").
40 *Stefanie L. Burt, Who Owns the Right to Store Gas: A Survey of Pore Space Ownership in U.S. Jurisdictions*, 4 Joule: Duq. Energy & Envtl. L.J. 1, 8 (2016).
41 *See Pomposini*, 580 A.2d 776, 778 (Pa. Super. 1990).
42 *Id*. at 777.
43 *Id*.
44 *Id*. at 778.
45 2012 WL 3043008 (M.D. Pa.). Although filed in federal court because the parties were citizens of different states—what is known as diversity jurisdiction—the case was decided applying Pennsylvania state law.
46 *Id*. at *1.
47 *Id*. at *2.
48 *Id*. at *4.
49 P.L 933, No. 87.
50 *See* Douglas Hale Gross, *What Constitutes Reasonably Necessary Use of the Surface of the Leasehold by a Mineral Owner, Lessee, or Driller Under an Oil and Gas Lease or Drilling Contract*, 53 A.L.R.3d 16.
51 *See Oberly v. H.C. Frick Coke Company*, 104 A. 864 (Pa. 1918); *Humberston v. Chevron U.S.A., Inc.*, 75 A.3d 504 (Pa. Super. 2013); *see also Belden & Blake Corp. v. Dep't of Conservation & Natural Resources*, 969 A.2d 528, 532 (Pa. 2009).
52 *Belden & Blake Corp.*, 969 A.2d at 532 (quoting *Chartiers*, 25 A. at 598).
53 *See, e.g., Rochez Bros. v. Duricka*, 97 A.2d 825, 825 (Pa. 1953); *Herder Spring Hunting Club v. Keller*, 93 A.3d 465, 467 (Pa. Super. 2014), *aff'd*, A.3d 358 (Pa. 2016); *Shawville Coal Co. v. Menard*, 421 A.2d 1099, 1101 (Pa. Super. 1980).
54 *Chartiers Block Coal Co. v. Mellon*, 25 A. 597, 599 (Pa. 1893).
55 *Chartiers*, 25 A. at 599.
56 *See id*.
57 *Id*.
58 *Id*. at 599-600.
59 Professor Joseph Schremmer has argued that, when conflicts arise between subsurface estates, the common law rules in many states give preexisting uses priority over later-initiated uses. *See* Joseph A.

Schremmer, *The Concurrent Use of Land for Carbon Sequestration and Mineral Development*, 75 Baylor L. Rev. 630, 660 (2023). Pennsylvania does not appear to have adopted such a rule, which arguably would conflict with the Pennsylvania Supreme Court's reasoning in *Chartiers*, which seems to place the earlier coal rights on par with the later natural gas rights. 25 A. at 599. In SB 831, adopted as this paper was being finalized, the Pennsylvania General Assembly specified that among subsurface uses, coal, oil, and gas have priority over pore space. SB 831 (2024).

60 *See Wheatley v. Baugh*, 25 Pa. 528, 531-32 (1855).

61 *See Bumbarger v. Walker*, 164 A.2d 144, 148 (Pa. 1960).

62 224 A.3d 334 (Pa. 2020).

63 *See id*. at 352.

64 *See Briggs v. Sw. Energy Prod. Co.*, 245 A.3d 1050 (Table), 2020 WL 7233111 (Pa. Super. Ct. 2020).

65 *See Briggs*, 224 A.3d at 352.