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Developing and Producing Coalbed Gas: Ownership, Regulation, and Environmental Concerns

Harry Cohen*

I. Introduction

In spite of what seems to be a surplus of oil and gas today¹ there is a rapidly growing interest in developing and producing the gas found in coalbeds.² This gas is produced from the coal by artificially stimulating the coal seams in order to create a fracture in the seam which increases the drainage radius of a well drilled into the coal. A combination of water and sand is injected into the seam, in a process called hydrofracturing, which increases the released gas flow by at least five times the amount obtainable without such inducement.³

The Natural Gas Policy Act of 1978⁴ classifies coalbed gas as "high cost" gas and treats it differently from other forms of natural gas.⁵ This is because recovery of gas from coalbeds is different from and more difficult than recovery from existing oil and gas reservoirs.⁶

Why should the United States worry about production of

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1. See N. Y. Times, Jan. 31, 1985, at D21, col. 4. The Times reported that an "oil glut" on the market is causing both OPEC and North Sea producers to lower official crude oil prices.

2. Craig & Myers, *Ownership of Methane Gas in Coalbeds*, 24 Rocky Mtn. Min. L. Inst. 767 (1978).

3. *Id.* at 769-70.

4. 15 U.S.C. §§ 3301-3432 (1982).

5. 15 U.S.C. § 3317(c)(2) (1982).

6. Olson, *Unconventional Sources of Natural Gas; Laws, Regulation, and Development*, 106 Pub. Util. Fort. 34 (1980). "Wells designed to recover this resource will use a combination of oil well and water well technology. Because of high pressure and volumes of water involved, they will be expensive to drill and complete."

coalbed gas when there are large amounts of natural gas to be had? The answer is to be found in a look at the long-term energy picture. World oil and gas reserves are still large, and at present rates of consumption there is probably enough fuel to satisfy everyone well into the next century and beyond. However the domestic United States' situation with regard to oil and gas is not as good as that of the world as a whole.⁷

Since the United States must rely on foreign oil and gas production for much of its needs, existing problems are not so much of adequacy of supply, but of how much that supply will cost and whether suppliers will continue to sell to the United States. Although the present situation is not as dark as it was several years ago, and some feel that worldwide competition will insure the continuance of Mid-East supplies, outside interests may create future problems for the United States.⁸ The United States has delayed comprehensive planning for its future energy needs and still has no firm national energy policy. Hence it is in the best interest of the United States to plan to utilize all sources of energy for the future.⁹

Coalbed gas development, which is often thought of as a recent phenomenon, is a good example of the sporadic and inconsistent manner in which the United States has approached its energy situation. Coalbed gas was freely liberated from mines throughout the coal producing areas of the country, and its economic value was known in the early 1930's. The gas was primarily regarded, however, as a danger to miners which had to be cleared from coal mines before the coal could be safely mined.¹⁰ Although "successful production of marketable gas

7. See Stobaugh, *World Energy to the Year 2000*, in *Global Insecurity*, 29, 33-42 (D. Yergin and M. Hillebrand eds. 1982); Cohen, *The Relationship Between Water Conservation & Mineral Development*, 31 Ala. L. Rev. 547, 550 (1980) [hereinafter cited as Cohen, *The Relationship*].

8. See Yergin, *The Dependence Dilemma: Gasoline Consumption and America's Security*, 17 (1980). "Our overdependence on oil creates a new situation in American history, and translates into extreme vulnerability, whether measured in economic or political terms, or in terms of military security."

9. See Sachs, *Our Energy Options - So What Else Is New?* 3-4; Johnson, *The Impact of Price Controls on the Oil Industry: How To Worsen an Energy Crisis* 99-100, in *Energy, The Policy Issues* (G. Eppen ed. 1975).

10. Note, *On Leasing Gas From Coal Seams*, 47 W. Va. L.Q. 211, 218 (1941).

from coal seams"¹¹ was actually obtained in the 1930's and 1940's, little notice was taken, since thousands of oil and natural gas wells had been and were being drilled all over the country at that time. These wells were producing more than enough cheap fuel for the country's needs.

Although coalbed gas was being successfully produced as early as the 1930's numerous technological problems still have not been solved today. Similarly, legal issues surrounding the development of coalbed gas have only recently begun to receive judicial and legislative attention. Sooner or later the United States will have an economic need for coalbed gas production. The relevant technological questions must therefore be answered and the legal issues must also be confronted.

A primary question is whether the owner of the coal owns the gas which accumulates in and around the coal. Producers who are confused about ownership of gas or minerals will not quickly develop these resources. This issue must be settled before the development of coalbed gas production can proceed.¹²

Regulation of the drilling for and the taking of the gas from the coalbeds is another problem. Are existing conservation statutes, applicable to oil and gas development, to be applied to coalbed gas? Also, are environmental standards applicable to the production of coal to be utilized when there is preparation of the coalbeds for drilling?

These three topics - ownership of coalbed gas, conservation of the substance, and the environmental problems of coalbed gas production - involve a set of issues which must be resolved in order for the consistent production of the gas to be economically feasible.

II. Ownership of Coalbed Gas

A. *United States Steel Corp. v. Hoge*

It is obvious that ownership of land and resources by one

11. *Id.* at 213.

12. McGinley, *Legal Problems Relating to Ownership of Gas Found in Coal Deposits*, 80 W. Va. L. Rev. 369, 392 (1978).

person or entity simplifies legal issues involved in the development of that land and its resources. If the coal, oil, or gas has not been severed from the title to the land, most of the potential coalbed gas developer's worries involve dealing with administrative agencies, gaining permits, and solving technical problems. Where, however, the coal is separately owned, and a developer is interested in producing the coalbed gas, the question arises whether the owner of the coal or the landowner (or a lessee of "minerals" or "gas") has the right to the coalbed gas.

An initial inquiry concerns the nature of coalbed gas. Methane in coal is a result of:

biochemical and bacterial transformation [which occurs] during the peat state of coal deposition and subsequently by metamorphic processes as buried peat increases in rank to become coal. Because of the fine pore structure of coal and degraded peat, sorptive capacities of such substance are very large so that much of the methane evolved during coalification is held in the peat and in the coal.

As a coal seam is mined, the methane migrates to the face of the mining operation and is released into the air. It is at this point where it tends to accumulate and present a threat to the miners and the mining operation. The ignition of accumulated methane causes most mine explosions.¹³

Since the gas originated with the coal itself, it can be argued that it is owned by the owner of the coal.

*United States Steel Corp. v. Hoge*¹⁴ was the first major case to deal with this subject. It involved the classic situation with regard to coalbed gas ownership issues. U.S. Steel had purchased the coal under the land in the early part of this century. The surface owners at the time of the conveyance retained the right to drill through the coal for oil and gas extraction. The defendant obtained an oil and gas lease to the

13. Olson, *Coal Bed Methane: Legal Considerations Affecting Its Development as an Energy Resource*, 13 Tulsa L.J. 377, 379-80 (1978).

14. 503 Pa. 140, 468 A.2d 1380 (1983).

tract in 1976 with the right to take "all of the oil and gas and all of the constituents of either"¹⁵ under the land. U.S. Steel opened a mine in 1977, and in 1978 the lessee began drilling a well on the tract for the "express purpose of recovering coalbed gas contained in the subadjacent Pittsburgh coal seam."¹⁶ U.S. Steel then initiated a suit to terminate what it considered a trespass to its ownership of the coal and coal gas. It sought an injunction to prevent the hydrofracturing of the coal seam.¹⁷ It argued that the coalbed gas was an integral part of the coal, scientifically and generally, and that the gas was therefore owned by the owner of the coal.¹⁸

In holding in favor of the lessee of the gas, the lower appellate court felt that the coal severance deed actually reserved the coalbed gas in and around the coal to the grantor. The court found that at the time of the conveyance of the coal there was no common understanding that the coalbed gas was part of the coal itself.¹⁹ In addition, the court said that Pennsylvania has a peculiar rule which holds that natural gas is not a "mineral" and thus a deed conveying "coal and other minerals" would not encompass gas. The court refused to distinguish natural gas from coalbed gas since gas had been taken in Pennsylvania over the years from any place it was found, even from coal seams.²⁰ The court also stated that the right under coal deeds to ventilate the coalbed gas was not a right to the gas itself.²¹

This decision created a dichotomy with regard to ownership of coalbed gas. The coalbed gas could be developed by the surface owner or its lessee if the coal owner was not mining the coal. If the coal was being mined, however, the coal owner could save the gas and market it. In the Superior Court's view, coalbed gas was only owned by the landowner if

15. *United States Steel Corp. v. Hoge*, 304 Pa. Super. 182, 187, 450 A.2d 162, 164 (1982).

16. *Id.*

17. *Id.*

18. *Id.* at 195, 450 A.2d at 168-69.

19. *Id.*, 450 A.2d at 169.

20. *Id.* at 196, 450 A.2d at 169.

21. *Id.* at 198, 450 A.2d at 170.

it was not being bled or liberated by the coal miner.²²

On appeal to the Supreme Court of Pennsylvania, the lower appellate court was overruled.²³ The Supreme Court held that because "subterranean gas is owned by whoever has title to the property in which the gas is resting. . . such gas as is present in coal must necessarily belong to the owner of the coal, so long as it remains within his property and subject to his exclusive dominion and control."²⁴

The reservation in the grantor, the court continued, of the right to drill through the coal seam for oil and gas, included only the right to drill for oil and gas as generally recognized at the time. The parties could only have intended that the grantor had the right to drill into oil and gas reservoirs, and not into coal for a "waste product with well known dangerous propensities."²⁵

The Supreme Court of Pennsylvania was justified in holding for U.S. Steel in *Hoge*. Judicial severance of the coalbed gas from the coal would cause numerous problems in administering the taking of coalbed gas. If the coal mining does not start before the gas is developed, the mining will be deterred for some time or perhaps forever. Surely there will be numerous confrontations between the parties if there is dual development of the gas and the coal. All of this can be avoided if the coal owner is held to have title to the coal gas.

B. *Legal Analogies to the Coalbed Gas Situation*

1. *Combined Product Analogies*

Fuel producing states throughout the country have encountered and adjudicated various conflicts which are analogous to those which arise in the coalbed gas situation. None of these, however, perfectly resolve coalbed gas problems, and their use in the analysis of those problems is a sort of "grab bag" activity.

22. *Id.* at 202, 450 A.2d at 172-73.

23. *United States Steel Corp. v. Hoge*, 503 Pa. 140, 468 A.2d 1380 (1983).

24. *Id.* at 147, 468 A.2d at 1383.

25. *Id.* at 149, 468 A.2d at 1385.

Pennsylvania case law, for example, contains a number of these analogies which were considered by the courts in *Hoge*.²⁶ The cases involved could be placed under the heading of by-product or refuse fact situations.

In *Kier v. Peterson*²⁷ a lessee of salt rights brought up oil from a salt well. The parties argued over the lessee's right to the oil which came up with the salt. The court said that "petroleum or mineral oil is naturally to be expected in the salt formation. . ."²⁸ and the lessee must deal with the oil. Since he must separate the oil from the salt and either waste it or market it, the court said, the lessee must have a right to the oil.²⁹ This case, which may be classified as one dealing with "commingled materials,"³⁰ supported the U.S. Steel position in *Hoge*.³¹ Other Pennsylvania cases, however, did not.

*Appeal of Erwin*³² dealt with ocher or refuse which resulted from the washing of iron ore by the lessee of the iron. This ocher is analogous to the coalbed gas which the coal lessee has a right to ventilate.³³ The Supreme Court of Pennsylvania said that the parties only intended to deal with the clean and merchantable iron ore and not with the ocher. Since the parties did not contemplate that the refuse from the leased ore would be a mineral of value thereafter, the landowner was entitled to the ocher.³⁴

In *Doster v. Friedensville Zinc Co.*³⁵ a mineral lease required the lessee to pay a royalty on "zinc ores, sulphurets of zinc and iron ores."³⁶ Refuse materials from the mining opera-

26. Several law review articles on the coalbed gas ownership problem were published after the original suit was filed in *Hoge*. These were relied on by the lower appellate court in making its decisions in the case. See Craig & Myers, *supra* note 2; McGinley, *supra* note 12; Olson, *supra* note 13.

27. 41 Pa. 357 (1862).

28. *Id.* at 361.

29. *Id.* at 362.

30. See Craig & Myers, *supra* note 2, at 792.

31. 304 Pa. Super. at 201, 450 A.2d at 171.

32. 12 A. 149 (Pa. 1887).

33. See Craig & Myers, *supra* note 2, at 793.

34. 12 A. 149 (Pa. 1887).

35. 140 Pa. 147, 21 A. 251 (1891).

36. *Id.* at 149, 21 A. at 251.

tion were later found to be marketable. The landowner claimed ownership of this refuse and the court agreed with him. It held this material to be waste which the parties did not intend to cover in the lease.³⁷

*Doster*³⁸ and *Erwin*³⁹ can be distinguished from *Kier*.⁴⁰ In *Kier* the oil was produced naturally with the salt, while in the former cases the refuse was a result of the processing of the primary mineral and not a commingled mineral which was brought out of the well or mine by the developer.⁴¹

Other analogous situations arise in states which produce large amounts of oil and natural gas. These situations involve the relative rights of parties to an agreement dealing with oil or gas when liquid "casinghead gas" comes up from the casing in an oil and gas well, or when sulfides are extracted from gas and claims are made that the sulfides are part of the gas.

"Casinghead gas" is a liquid form of hydrocarbon which is neither oil nor gaseous gas. The question of whether casinghead gas is legally considered oil or gas has arisen many times in Texas, Oklahoma, and Louisiana.⁴² The Fifth Circuit has said on at least two occasions⁴³ that this liquid - called casinghead when it comes up with oil and "condensate" when it is produced alone - should be considered more like oil than gaseous gas.

Texas has considered such a substance to be oil for royalty purposes,⁴⁴ although other States have disagreed. Oklahoma has found it to be neither oil nor gas and has held that a conveyance of oil and gas would not cover casinghead

37. *Id.* at 151-52, 21 A. at 252.

38. 140 Pa. 147, 21 A. 251 (1891).

39. 12 A. 149 (Pa. 1887).

40. 41 Pa. 357 (1862).

41. See Craig & Myers, *supra* note 2, at 793.

42. See, e.g., *Wemple v. Producers Oil Co.*, 145 La. 1031, 83 So. 232 (1919); *Livingston Oil Corp. v. Waggoner*, 273 S.W. 903 (Tex. Civ. App. 1925); *Hammett Oil Co. v. Gypsy Oil Co.*, 95 Okla. 235, 218 P. 501 (1923). See generally R.W. Hemingway, *The Law of Oil and Gas*, 342-51 (2d ed. 1983).

43. *Duke v. Sun Oil Co.*, 320 F.2d 853 (5th Cir. 1963); *Vernon v. Union Oil Co.*, 270 F.2d 441 (5th Cir. 1959).

44. *Reynolds v. McMan Oil & Gas Co.*, 11 S.W. 2d 778 (Tex. Com. App. 1928); *Livingston Oil Corp. v. Waggoner*, 273 S.W. 903 (Tex. Civ. App. 1925).

gas.⁴⁵

Scott Paper Co. v. Taslog, Inc.,⁴⁶ a recent Fifth Circuit decision, entertained a different, though related problem. In that case the owner of 225,000 acres of land in Alabama executed twelve oil and gas leases on its property. Thereafter the lessor executed non-participating royalty interests in the oil and gas under its lands. The royalty deeds granted a one-eighth royalty on "gas including casinghead gas and other gaseous substance produced from the premises."⁴⁷ Large gas reserves were discovered on the property and production was begun. The gas produced from the field contained both hydrocarbon and non-hydrocarbon gases commingled in a single stream. Hydrogen sulfide gas was separated from the raw gas stream.⁴⁸ The hydrogen sulfide gas was then processed through the facility's sulphur unit where elemental sulphur was extracted from the gas. After removal of the sulfide, further processing converted the gas into several liquid components as well as dry residue gas. All were sold from a treatment facility.⁴⁹

No royalty was paid on the hydrogen sulfide component of the gas. The court held, however, that the terms "gas including casinghead gas and other gaseous substance" included all constituents of the mineral produced.⁵⁰ The parties were not dealing, the court said, with elemental sulphur produced from the land but rather with "gas."⁵¹ The court cited and relied upon cases where leases of "all the oil and gas deposits" were held to include "helium, a non-hydrocarbon component of the total gas stream."⁵²

Herein lies the coalbed gas analogy. If the coalbed gas is

45. *Hammett Oil Co. v. Gypsy Oil Co.*, 95 Okla. 235, 218 P. 501 (1923).

46. 638 F.2d 790 (5th Cir. 1981).

47. *Id.* at 792.

48. *Id.* at 793.

49. *Id.*

50. *Id.* at 796-97.

51. *Id.* at 796.

52. *Id.* at 794. *See, e.g., Northern Natural Gas Co. v. Grounds*, 441 F.2d 704 (10th Cir. 1971). In this case landowners claimed that oil and gas leases did not include helium, but were limited to oil and gas as such. The court, however, held that a grant of "gas" covered all components of the gas stream, including helium.

viewed as part of the coal seam itself, just as components of the gas are part of the gas, then the owner of the coal would own the coalbed gas.

2. Existing Ownership Theories

Lillibridge v. Lackawanna Coal Co.,⁵³ cited by the lower appellate court in *Hoge*,⁵⁴ involved the concept of space ownership. The case dealt with the right of a surface owner to enjoin a coal owner from transporting coal mined under an adjacent tract through shafts and passageways cut in the coal under the surface owner's tract. The surface owner argued that nothing more than coal passed to the coal owner by the conveyance of coal and that the "chamber or space left by the removal of the coal under the mining operations"⁵⁵ was owned by the fee simple owners or the possessors of the reversionary interests. The court, however, could not conceive of ownership of the coal without ownership of the space it occupied.⁵⁶

The owner of the coal, therefore, had a right to deal with the space in which the coal was found. This supports the theory that the owner of the coal has the right to all that is integral to the coal, and since methane gas is embedded in the coal, it too should be considered part of the grant of the coal.

Chartiers Block Coal Co. v. Mellon,⁵⁷ also discussed in *Hoge*,⁵⁸ supports a contrary conclusion. This was another classic Pennsylvania case involving the relationship between a gas lessee and a coal producer. It dealt with the right of a gas lessee to drill through coal deposits to reach gas at some depth below the coal. The court held that the gas lessee could drill through the coal to reach the gas but that if the coal was damaged, the gas lessee would be liable.⁵⁹

53. 143 Pa. 293, 22 A. 1035 (1891).

54. 304 Pa. Super. 182, 450 A.2d 162 (1982).

55. *Lillibridge*, 143 Pa. at 300, 22 A. at 1036.

56. *Id.* at 301, 22 A. at 1037. "In a state of nature the coal necessarily occupied space. How could the defendant own the coal absolutely and in fee-simple, and not own the space it occupied?"

57. 152 Pa. 286, 25 A. 597 (1893).

58. 304 Pa. Super. 182, 450 A.2d 162 (1982).

59. *Chartiers*, 152 Pa. at 293-94, 25 A. at 599.

In this case the coal owner had the right to take away the coal. The space it occupied, however, belonged to the surface owner, who had a right of access to reserved gas below the coal. The coal owner, it was held, had to enjoy his rights in a manner which did not interfere with rights in the land possessed by others.⁶⁰

In a related area, surface owners and lessors of lands producing natural gas have fought for some time over the right to store gas in depleted geological formations. When the problem has been squarely presented, the courts have said that the surface owner has the right to the "geological structures beneath the surface, including any such structure that might be suitable for the underground storage of 'foreign' or 'extraneous' gas produced elsewhere."⁶¹ This is similar to the view expressed in *Chartiers*,⁶² which considered the rights of the surface owner as primary and the rights of the coal producer as limited narrowly to the coal itself.

Although some space ownership cases give support to the argument that the landowner or gas grantee has a right to all that is around and within the coal, they are not acutely relevant to the coalbed gas situation. Coalbed gas, unlike the space in which the coal lies, imposes serious obligations on a coal producer. He has environmental duties, as well as responsibility for the safety of the miners.⁶³ Since the coal miner has these obligations with regard to the coal, the use and marketing of mining by-products should go with the responsibilities.

A distinct group of ownership theories has evolved in the field of oil and gas production. When these substances were first commercially produced some courts analogized them, especially natural gas, to wild animals, and said that they were

60. *Id.* "No one will deny the title of the surface owner to all that lies beneath the strata which he has sold. If he is denied the means of access to it he is literally deprived of an estate which he never parted with."

61. *Emeny v. United States*, 412 F.2d 1319 (Ct. Cl. 1969); *Miles v. Home Gas Co.*, 35 A.D.2d 1042, 316 N.Y.S.2d 908 (1970).

62. 152 Pa. 286, 25 A. 597 (1893).

63. See, e.g., *Commonwealth v. Barnes & Tucker Co.*, 9 Pa. Commw. 1, 303 A.2d 544 (1973) (holding that the coal operator is liable under environmental regulations for acid mine drainage even though the mine has been abandoned). See also Cohen, *The Relationship*, *supra* note 7, at 559-61.

ferae naturae.⁶⁴ The landowner or those under him had a right to capture, but the substances were fugitive and wandering by nature and were not owned until captured.⁶⁵ In states that apply this non-ownership theory one can grant only a profit a prendre or a right to capture oil and gas. There can be no fee simple interest in them.⁶⁶ If this theory is applied to coalbed gas ownership, it would follow that coalbed gas is not subject to fee simple ownership because it migrates through coal and porous rock to areas of reduced pressure or to exposed surfaces.⁶⁷

Another theory of oil and gas ownership is the ownership-in-place theory under which ownership of oil and gas is subject to the same rules as are generally applied to ownership in fee simple. According to this theory oil and gas are subject to ownership while embedded in the earth.⁶⁸ Thus oil and gas can be severed from the title to the land and bought and sold in fee simple. Such fee simple rights are not subject to abandonment as is the profit a prendre of the non-ownership theory.⁶⁹ Of course courts in ownership-in-place jurisdictions also state that non-owners have a right to capture the substances if they migrate. Nevertheless the right to take is capable of being transferred in fee simple.⁷⁰

Application of this ownership-in-place theory to the coalbed gas situation yields varied results. If cases such as *Lil-bridge*⁷¹ are followed in conjunction with this theory, the coal owner would be granted the gas which is found in the stratum itself along with the coal seams. However, if other

64. See, e.g., *Westmoreland & Cambria Natural Gas Co. v. DeWitt*, 130 Pa. 235, 18 A. 724 (1889).

65. *Id.* at 249, 18 A. at 725.

66. See Cohen, *Property Theories Affecting the Landowner in a New Oil and Gas Producing State*, 10 Ala. L. Rev. 323, 337 (1958) [hereinafter cited as Cohen, *Property Theories I*].

67. See generally *Back v. Ohio Fuel Gas Co.*, 160 Ohio St. 81, 113 N.E.2d 865 (1953) (discussing the migratory nature of oil and gas).

68. See Cohen, *Property Theories I*, *supra* note 66, at 334-35.

69. *Id.* at 337.

70. *Id.* at 334.

71. 143 Pa. 293, 22 A. 1035 (1891).

cases⁷² are followed the landowner would own the stratum and therefore would have a claim on all but the coal itself.

Oil and gas ownership concepts were created in an attempt to settle rights of adjoining landowners to the substances beneath what were at times very large expanses of land. These theories have not yielded answers to all problems of oil and gas law. A court sitting in a non-ownership state, for example, can discuss abandonment of the oil and gas interests granted by landowners, but only a handful of non-ownership states have applied the doctrine of abandonment to oil and gas interests.⁷³ Similarly, though such a court could, in theory, hold that negligence concepts do not apply to non-owned oil and gas, this has not been done.⁷⁴

Ownership theories applicable to oil and gas in the past not only have diminished utility in oil and gas law today, but they offer even less help in the coalbed gas situation. Coalbed gas cases involve a dispute between the owner of the coal and the landowner or his gas grantee in the same tract. Oil and gas ownership theories, on the other hand, seek to resolve disputes between owners of adjacent tracts. Secondly, oil and gas ownership theories cannot determine who owns coalbed gas in any case. No matter which theory is chosen, the gas is still part of the coal seam until it is liberated. Ownership-in-place or non-ownership ideas, like space ownership theories, simply do not provide an adequate answer.

3. *The Terms "Coal," "Gas," and "Minerals"*

Another significant problem in the coalbed gas situation concerns the interpretation of terms such as "coal," "gas," and "minerals" in conveyances - especially those deeds and grants which were executed before there was an awareness of the possible value of coalbed gas. Courts have often held that if a specific substance, such as oil, is conveyed or reserved,

72. See, e.g., *Emeny v. United States*, 412 F.2d 1319 (Ct. Cl. 1969).

73. But see *Gerhard v. Stephens*, 68 Cal. 2d 864, 442 P.2d 692 (1968) (a rare modern case where abandonment is seriously considered).

74. See *Larkins-Warr Trust v. Watchorn Petroleum Co.*, 198 Okla. 12, 174 P.2d 589 (1946); *McCoy v. Arkansas Natural Gas Co.*, 175 La. 487, 143 So. 383 (1932).

there is no intention to include other substances such as gas.⁷⁵ Similarly, it could be argued that a conveyance of "coal" would not include coalbed "gas." This analogy would deprive an owner of coal of the coalbed gas. In addition, the methane gas which emanates from coal seams is substantially the same as the natural gas which is found near or with oil, or by itself in reservoirs or strata.⁷⁶ Thus, if there is a lease or conveyance using the term "gas" in the generic sense, a court will have the almost impossible task of deciding whether coalbed gas has been conveyed.

The term "minerals," however, presents an even greater problem. The term has been given a number of interpretations and meanings. Numerous courts have held that the term "minerals" includes such things as coal, oil, and gas,⁷⁷ although other courts maintain that "minerals" does not include those resources which were not known to be commercially valuable at the time of the grant.⁷⁸ Texas and Alabama have case law which holds that oil is a "mineral,"⁷⁹ and other states have held various substances as coming within the meaning of that term.⁸⁰

Sometimes courts hold that the doctrine of ejusdem generis applies. Under this doctrine specific mention of substances such as coal, oil, or gas will modify any general statement of what is conveyed by the term "minerals." Thus a con-

75. See, e.g., *Bundy v. Myers*, 372 Pa. 583, 94 A.2d 724 (1953).

76. *McGinley*, *supra* note 12, at 382-83.

77. *Burke v. Southern Pac. R.R. Co.*, 234 U.S. 669 (1914); *Wall v. Shell Oil Co.*, 209 Cal. App. 2d 504, 25 Cal. Rptr. 908 (1962); *Kentucky - West Virginia Gas Co. v. Browning*, 521 S.W.2d 516 (Ky. Ct. App. 1975); *Weaver v. Richards*, 156 Mich. 320, 120 N.W. 818 (1909). See generally *R.W. Hemingway*, *supra* note 42, at 8-10.

78. *Stegall v. Bugh*, 228 Ark. 632, 310 S.W.2d 251 (1958); *Ambarann Corp. v. Old Ben Coal Corp.*, 395 Ill. 154, 69 N.E.2d 835 (1946); *Huie Hodge Lumber Co. v. Railroad Lands Co.*, 151 La. 197, 91 So. 676 (1922).

79. *Southland Royalty Co. v. Pan American Petroleum Corp.*, 378 S.W.2d 50 (Tex. 1964); *Holmes v. Compton*, 273 Ala. 554, 142 So.2d 697 (1962); *Carter Oil Co. v. Blair*, 256 Ala. 650, 57 So.2d 64 (1952).

80. *United States v. 1,253.14 Acres of Land*, 455 F.2d 1177 (10th Cir. 1972) (gravel); *McCombs v. Stephenson*, 154 Ala. 109, 44 So. 867 (1907) (shale); *Geothermal Kinetics, Inc. v. Union Oil Co.*, 75 Cal. App. 3d 56, 141 Cal. Rptr. 879 (1977) (geothermal steam); *State v. Evans*, 46 Wash. 219, 89 P. 565 (1907) (clay).

veyance of "oil, gas and minerals" will not include coal.⁸¹ It cannot be said, however, that this doctrine is the majority rule, and inclusion or exclusion is normally said to be a matter of the intentions of parties.⁸²

Broad interpretation of the term "minerals" suggests that if coalbed gas is not considered part of the coal seam, then the conveyance of "minerals" to someone other than the coal owner would include such gas. Once again, however, the statutory obligations placed on the coal owner argue for his ownership of the gas. It seems equitable that these obligations should be accompanied by benefits as coalbed gas becomes commercially valuable.

III. Statutory and Administrative Regulation of Coalbed Gas Production

A. *Applying Oil and Gas Regulatory Schemes to Coalbed Gas Development*

At the present time lawyers and regulatory agencies are in a quandary about the utilization of oil and gas regulations in the coalbed gas context. As with ownership issues, it might initially appear that the kind of reasoning applied to oil and gas regulation can be used in the coalbed gas situation. On close inspection, however, oil and gas conservation statutes have little application to coalbed gas operations. Physical conditions are present in the case of oil and natural gas which do not exist with coalbed gas. A survey of oil and gas conservation statute history will help to illustrate this.

In the early days of oil and gas development courts advised landowners and their grantees to protect themselves from losing oil and gas under their land to their neighbors by drilling wells themselves.⁸³ Random drilling and overproduction of oil and gas resulted in depressed prices, a boom and bust oil economy, and massive underground waste.⁸⁴

81. *Sloan v. Peabody Coal Co.*, 547 F.2d 115 (10th Cir. 1977).

82. *See Amoco Prod. Co. v. Guild Trust*, 636 F.2d 261 (10th Cir. 1980); *Lee v. Frank*, 313 N.W.2d 733 (N.D. 1981).

83. *See Barnard v. Monongahela Natural Gas Co.*, 216 Pa. 362, 65 A. 801 (1907).

84. *Cohen, Property Theories Affecting the Landowner in a New Oil and Gas*

Because oil and gas deposits are unities in the earth and cannot be extracted individually, random drilling disrupts the existing pressures in the reservoirs. The oil becomes viscous and hard to move. When dissipated inefficiently, natural energy in the reservoir leaves underground deposits in chaos and sometimes makes them impossible to produce.⁸⁵

Since the oil and gas must be produced together, individual surface ownership is not a useful basis for deciding when, where, or how much oil and gas should be produced. For this reason so-called conservation statutes were enacted to prevent the waste of underground and economic resources. First enacted in the early 1900's, these statutes have retained their basic characteristics until the present time.

The first type of conservation statute adopted the theory of well spacing, which is that only one well should be drilled where a single well can best produce the oil and gas beneath the ground. Effective well spacing is not subject to a definable acre pattern because it is based on a variety of factors such as reservoir energy, possibilities of fire or damage to the well structure, and the nature of the reservoir itself.⁸⁶ In spite of this scientifically proven fact, legislatures created statutes which defined well spacing units in terms of first twenty, then forty, and presently one hundred and sixty acre units for oil and up to six hundred and forty acres for gas.⁸⁷ Consequently well spacing is to some extent a political and social tool which allows landowners a greater share of the oil and gas at the expense of possible waste and misuse of a valuable natural resource.⁸⁸

There are also pooling statutes. In most states the owner of a small tract is forced to combine his or her land with similar tracts within a defined acreage unit and to share the proceeds from one well. Fewer unnecessary wells are drilled, but

Producing State, 11 Ala. L. Rev. 79 (1958) [hereinafter cited as Cohen, *Property Theories II*].

85. *Id.* at 80.

86. *Id.* at 86-88.

87. *See, e.g.*, Ala. Code § 9-17-12 (1975).

88. *See State Oil & Gas Bd. v. Mississippi Min. & Roy. Own. Ass'n.*, 258 So.2d 767, 777, 783-84 (Miss. 1971).

here also the size of the acreage unit is often limited in order to allow all landowners to gain a greater share of income from the wells drilled.⁸⁹ Even though a well may be scientifically considered unnecessary, landowners and their grantees must be placated and given a greater share of the resource produced than they would receive if exact scientific principles prevailed.⁹⁰

The approaches described above are incomplete and insufficient attempts at conservation. Every oil and gas producing state suffers from unneeded wells being drilled because of well spacing unit size restrictions. Therefore it has been suggested that drilling decisions should be made on the basis of calculations which consider the entire underground geological formation involved.⁹¹ Under this theory of "unitization" or "unit operation" all those who own rights in an oil and gas reservoir would have to combine their operating interests for the sake of efficient and sensible reservoir production.⁹²

It should be obvious that coalbed gas conservation problems are very different from those involved in the oil and gas conservation situation. The whole purpose of oil and gas statutes is to prevent loss of oil and gas by inefficient production. Coalbed gas, by contrast, will not be wasted if various owners compete for it. There will be no loss of the resource through its being made more viscous in the reservoir. Further, natural gas moves quickly in a permeable stratum toward the well head while coalbed gas has to be stimulated before it can be captured at all.

B. *State Multi-Resource Regulation*

No state has as yet specifically regulated coalbed gas production. What shape state regulatory statutes would take is open to conjecture. Would the legislature state that a coalbed gas owner must extract the gas at a time convenient to the

89. *Id.* at 777.

90. *Id.* at 780, 783-85.

91. Hardwick, *Oil Well Spacing Regulations and Protection of Property Rights in Texas*, 31 Tex. L. Rev. 99, 122-27 (1952).

92. Cohen, *Property Theories II*, *supra* note 84, at 90-91.

coal owner or operator? Also, can a legislature deem one party or the other the owner of the gas?

Some legislatures, without having the coalbed gas problem specifically in mind, have tried to deal with the multi-resource situation. North Dakota has created a commission to deal with and resolve conflicts among competing interests in natural resources.⁹³ This commission can require bonds from producers whose operations create such conflicts with other producers.⁹⁴ It can also enjoin producers' activities⁹⁵ after an appropriate hearing.⁹⁶ The North Dakota scheme can be helpful in the coalbed gas situation. At least no rash or automatic decisions will be made without a hearing on the facts of each particular case.

A Kentucky statute covers the situation where an oil or gas well is drilled into a "coal bearing stratum."⁹⁷ It provides that, if the coal is not being taken, the oil and gas operator must notify the record owner of the coalbed.⁹⁸ If the coal is being mined notice must also be given to the operator.⁹⁹ Under this statute those with an interest in the coal are at least warned that something is about to happen to the substance. This statute, however, has less application to the production of coalbed gas than the North Dakota statute does because it deals more directly with the relationship between oil and gas interests and coal owners and operators.

Under a Virginia multi-resource statute an inspector is authorized to determine the appropriateness of the drilling of an oil and gas well in the vicinity of a coal operation.¹⁰⁰ Nearby coal operators, as well as many other parties, are identified in the application for the oil and gas well permit.¹⁰¹ The statute provides a long list of factors for the inspector to con-

93. N. Dak. Cent. Code § 38-15-01 (1980).

94. *Id.* § 38-15-03.

95. *Id.* § 38-15-05.

96. *Id.* § 38-15-04.

97. Ky. Rev. Stat. § 353.600 (1983).

98. *Id.* § 353.600(1).

99. *Id.* § 353.600(2).

100. Va. Code § 45.1-293 (Cum. Supp. 1984).

101. *Id.* § 45.1-312.

sider when mineral owners or coal owners object to the issuance of the permit.¹⁰² The Virginia statute also carefully outlines the procedures a gas and oil operator must follow if he proposes to drill a well through a coal seam.¹⁰³

This Virginia statute, like those of North Dakota and Kentucky, has some usefulness in the coalbed gas situation. The primary goal of these and similar statutes, however, is to insure that oil and gas operators will give notice to coal owners and operators that a well is to be drilled, after which a designated administrative agency will do its best to resolve any problems which result. No effort has yet been made to confront the problems which could arise when a coalbed gas operator tries to take gas from a coal seam and a coal owner or operator objects and demands the right to take the coal unimpeded by any drilling for coalbed gas.

Some states have passed statutes dealing with the owner-

102. *Id.* §§ 45.1-317, 45.1-318. The inspector is to consider several factors:

1. Whether the drilling location is above or in close proximity to any mine opening or shaft, entry, travelway, airway, haulageway, drainageway or passageway, or to any proposed extension thereof, in any operated or abandoned or operating coal mine, or any coal mine already surveyed and platted but not yet being operated;
2. Whether the proposed drilling can reasonably be done through an existing or planned pillar of coal, or in close proximity to an existing well or such pillar of coal, taking into consideration the surface topography;
3. Whether the proposed well can be drilled safely, taking into consideration the dangers from creeps, squeezes or other disturbances due to the extraction of coal; and
4. The extent to which the proposed drilling location unreasonably interferes with the safe recovery of coal, oil, and gas.

In addition, if the well is to be a gas well the inspector is to consider:

1. The extent to which the proposed drilling location will unreasonably interfere with present or future coal mining operations;
2. The feasibility of moving the proposed drilling location to a mined out area, below the coal outcrop, or to some other location;
3. The feasibility of a drilling moratorium for not more than two years in order to permit the completion of coal mining operations;
4. The methods proposed for the recovery of coal and gas;
5. The practicality of locating the well on a uniform pattern with other wells;
6. The surface topography and use; and
7. Whether the decision will substantially affect the right of the gas operator to explore for and produce the gas.

103. *Id.* § 45.1-334.

ship of natural gas. The Oklahoma legislature has determined that "all natural gas under the surface of any land in this state is hereby declared to be and is the property of the owner, or gas lessee of the surface under which gas is located in its natural state."¹⁰⁴ Virginia, also, has stated:

A. Except as otherwise provided by law, on or after January one, nineteen hundred seventy-eight, all migratory gases, including but not limited to propane and methane, shall be conclusively presumed to be the property of the owner of the surface real property beneath which such migratory gases are or may be located.

B. Litigation involving the legal construction of lease agreements entered into prior to the effective date of this section shall be governed by the applicable law in effect at the time the agreement or agreements were entered into. The circuit court in which such proceedings involving the construction of such leases are heard may permit, in the discretion of the court, commercial extraction of migratory gases; provided, however, that the court shall order reasonable royalties from the sale of such gases to be placed in an escrow account until the ownership of such gases is determined by final court order.¹⁰⁵

In the coalbed gas context there is a Constitutional problem with these types of statutes. Here a private right to gas ownership was in existence, and the legislatures determined that the surface owner or his lessees would own any gas located in the future. However, if a coal owner has asserted legal title to coalbed gas, statutes such as these cannot ipso facto determine such ownership. Such a legislative determination would be a denial of due process and equal protection under the law.

IV. Environmental Concerns and Coalbed Gas Drilling

Normally during the first few years of the life of a coalbed gas well, a great deal of water comes up to the surface through

104. Okla. Stat. Ann. tit. 52, § 231 (West 1969 and Supp. 1984).

105. Va. Code § 55-154.1 (1981).

the well's bore hole. This occurs because coalbeds and seams are also aquifers, and water deposits are naturally included in the coal formation. In addition, in drilling coalbed gas wells some water is injected into the coal seams during the fracturing process. Injected water and naturally existing water are produced along with the coalbed gas. Natural water from the coalbed aquifer is saline water which accumulated in geological time during the process which created the coal itself.¹⁰⁶ Thus the water which comes up through the coalbed gas well includes chlorides-compounds of substances in sea water.¹⁰⁷

Because of the recency of widespread interest in coalbed gas production, studies of and reaction to the negative environmental effects of the process are only beginning. The coal-rich State of Alabama, however, has already had considerable experience with the development of coalbed gas. Environmentalists in that state are concerned about the water pollution which may accompany coalbed gas production.

The Water Improvement Commission (WIC) of the Alabama Department of Environmental Management (ADEM)¹⁰⁸ supervises Alabama's water pollution laws. It is authorized to establish water quality standards,¹⁰⁹ to control discharges of sewage or industrial wastes,¹¹⁰ and to oversee a permit system with regard to the sources of such discharges.¹¹¹ This permitting power was transmitted to ADEM by the Environmental Protection Agency (EPA) in 1979.¹¹²

ADEM has for some time enforced EPA effluent limita-

106. Interview with Dr. Everette C. Brett, Director of the Natural Resources Center at the School of Mines and Energy Development of the University of Alabama (June 16, 1983).

107. Interview with Charles R. Horn, Chief, Industrial Waste, Water Division, EMDA in Montgomery, Alabama (June 16, 1983).

108. See Ala. Code §§ 22-22-1(b), 22-22A-4 (1984).

109. *Id.* § 22-22-9(g).

110. *Id.* § 22-22-9(j)(2).

111. *Id.* § 22-22-9(h).

112. See Cohen, *The Relationship*, *supra* note 7, at 582-83. The Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1376 (1982), created the National Pollution Discharge Elimination System which regulates point source discharges into waterbodies. The Act also established a permit system which allows any state with a program approved by the Environmental Protection Agency (EPA) to issue its own discharge permits. Effluent loads generated by such discharges are subject to review by EPA.

tions on metallic, acidic, and alkaline discharges from deep shaft coal mines. It has never, however, placed any limitation on salts or chlorides in the water emanating from those mines.¹¹³

As coalbed gas production in Alabama became more prevalent, ADEM began to investigate water discharges from coalbed gas wells as part of its permitting process. EPA, however, informed ADEM that effluent limitations designed for oil and gas wells were not applicable to the problem, since the technical aspects of coalbed gas production had not been considered in the creation of those effluent limitations.¹¹⁴

ADEM administrators are at present dealing with the matter of coalbed gas water pollution by placing limitations on coalbed gas water discharges in terms of salinity and chloride content. Although no such limitations are placed on discharges from deep shaft coal mines, the two discharges are from similar coal seams and are often of similar content. WIC says that this inconsistency is more apparent than real because water discharges from deep shaft coal mines are treated before being placed in any waterbody. In addition, salts and chlorides tend to "play out" and come to rest at the bottoms of settling ponds which are often constructed at the sites of coal mines. At the same time, of course, discharges into streams depend on such factors as stream flow, rainfall, and what is generally acceptable to the water quality of the entire stream environment.

WIC has been sensitized to problems with coalbed gas well water by experiences it has had with the damage that discharges of that water can cause. At one well site, for instance, discharges over a period of a year to eighteen months killed all shallow root vegetation within sixty feet of the well bore. Dogwoods and redbuds, as well as all scrub vegetation, were destroyed by the saline, chloride-laden water. There was no opportunity for dilution because there were no streams nearby. It has been suggested that coalbed gas well sites be provided with ponds or pits similar to those used in oil and

113. Interview with Charles H. Horn, *supra* note 107.

114. *Id.*

gas drilling operations. This would allow the salinity and chloride content of the water to be diluted over a period of time. Coalbed gas developers argue, however, that their financial considerations are different and that their operations cannot stand the added expense of pond or pit excavation.¹¹⁵

WIC officials admit that coalbed-gas well water discharges are a new enterprise for them, and that these discharges are not comparable to any other water discharges they have encountered. There is no doubt that this enterprise will be broadened and developed in the near future. One deep shaft coal mining company near Brookwood, Alabama is planning to drill nearly eleven hundred coalbed gas wells in advance of its deep shaft mining operations. In addition, a pioneer coalbed gas drilling operation at Oak Grove, near Birmingham, is soon to be greatly expanded. At present WIC can only say that it will check each well's discharges for high salinity and chloride content, and try to make sure that untreated polluted water will not reach fresh water streams and lakes.¹¹⁶

Like Alabama, the rest of the coal producing states in the United States are likely to see substantial expansion of coalbed gas operations within their borders. All such states will find it necessary to watch for and deal with the environmental problems associated with the production of this resource. Similarly, all such states would benefit from legislative guidance based on investigation into the technical realities of this particular resource.

V. Conclusion

Coalbed gas as a beneficial energy alternative has begun to come into its own, at least as far as industrial and institutional use is concerned. It is therefore necessary for legislatures to decide and resolve matters concerning coalbed gas in a manner which will further rather than thwart the development of this resource.

The question of the ownership of coalbed gas has already

115. *Id.*

116. *Id.*

received an appropriate judicial answer. The *United States Steel Corp. v. Hoge*¹¹⁷ decision, which gave ownership of the coalbed gas to the owner of the coal, seems logical and practical. If ownership of coal and coalbed gas is united, fewer problems will exist. The complex issues which arise from the fracturing of the coal seams by those who do not own the coal will be avoided. Moreover, the gas is in and part of the coal seam. Since the coal owner must remove it in order to mine the coal, that owner should also reap the benefits which accompany that burden. Finally, if the coal owner is held to own the coalbed gas, there are fewer conveyance problems and the environmental responsibilities are at least placed on one set of shoulders. The regulatory agencies may look to the owner of the coal initially in regulating both the taking of the gas and the coal itself.

The most important policy consideration for the legislatures should be the quick, efficient, and safe development of all available energy resources. The suggestions made herein flow from the need for such development.

It is possible to provide for forced pooling of small coal bearing tracts of land into coalbed gas producing units, and this may be a wise basis for legislation. Generally, however, regulatory approaches under statutes pertaining to oil and gas will not solve coalbed gas production problems, since the statutes did not evolve with those problems in mind.

It is time for comprehensive legislation to be prepared and promulgated to deal directly with coalbed gas production and its environmental impact. This legislation should consider all aspects of coalbed gas production including spacing, pooling, and pollution problems. Procedures for resolving conflicts between various natural resource operations should also be created. Legislative resolution of the legal issues surrounding coalbed gas will greatly facilitate the production of that as well as other resources, and foster the energy independence necessary for our future economic prosperity.

117. 503 Pa. 140, 468 A.2d 1380 (1983).