Fieldwide Unitization

Strudwick Marvin Rogers*

I. INTRODUCTION

Through my work with the Interstate Oil and Gas Compact Commission (IOGCC), I am personally aware of Arkansas's success in developing its oil and gas resources. To date, Arkansas has been a national leader in oil and gas conservation. The state has a reputation for thoughtful and responsible development of its oil and gas resources through the leadership of Larry Bengal, the current Director of the Arkansas Oil and Gas Commission, and his predecessor, Grant Black. Mr. Bengal has led numerous national committees that study and draft model statutes and regulations governing natural resource development. Deputy Director Shane Khorey has also become a leader in oil and gas conservation through his intimate knowledge and understanding of the legal field. Congratulations to those of you in Arkansas for your long-standing success in the development of your oil and gas resources.

This article addresses the importance of enhanced recovery, and the related legal concept of fieldwide unitization, during the development of oil and gas resources. Domestic petroleum production, which will reduce dependency on imports from OPEC countries, is crucial to American energy consumption and

---

* General Counsel, State Oil and Gas Board of Alabama; Adjunct Instructor, Cumberland School of Law at Samford University, Birmingham, Alabama. In his position as Hearing Officer, Rogers hears cases that arise before the State Oil and Gas Board. He represents the Board in appeals of Board orders and in environmental cases. Rogers represented the State of Alabama in the nation's most important hydraulic fracturing case, *LEAF v. EPA*, before the United States Court of Appeals for the Eleventh Circuit. *See* 276 F.3d 1253 (11th Cir. 2011). Rogers graduated with honors and was elected to *Phi Beta Kappa* as an undergraduate at the University of Alabama and served on the *Alabama Law Review* as a law student. He has written an oil and gas treatise published by the IOGCC, entitled *Significant Cases in Oil and Gas Law*. Interestingly, Rogers has also written a highly successful mystery novel, *The Bermuda Indenture*. Rogers expresses his appreciation to the *Arkansas Law Review*, the University of Arkansas School of Law, and Professor Phillip Norvell for the opportunity to present at the journal's annual symposium.

national security.[1] Working interest owners who invest resources to develop oil wells wish to maximize their return. Further, landowners who lease their mineral rights to oil companies expect maximum development of their oil and gas resources. Unfortunately, these expectations are often left unsatisfied because enhanced recovery operations and fieldwide unitization are not currently utilized to their fullest extent.[2]

Part II of this article briefly describes the technical aspects of enhanced recovery operations based on conversations with experts in the field. This provides the context for the discussion of fieldwide unitization that follows. Part III comprehensively explores fieldwide unitization, from its basic structure to its legal nuances. Part III also provides relevant commentary on seminal cases and addresses the legal implications of fieldwide unitization on oil and gas practitioners. Part IV concludes, emphasizing that fieldwide unitization is a principle predicated on fairness.

II. TECHNICAL ASPECTS OF ENHANCED OIL RECOVERY

Before this article addresses unitization, some simple engineering principles related to enhanced recovery operations must be explained. Producers employ enhanced oil recovery operations to recover substantial oil and gas resources that are not produced during "primary operations."[3] The terms "enhanced oil recovery" and "enhanced recovery" encompass pressure maintenance, secondary recovery, and tertiary recovery.[4] I gleaned several observations on enhanced recovery operations from conversations with two respected experts on

1. *See* WALTER A. ROSENBAUM, ENVIRONMENTAL POLITICS AND POLICY 279-81 (9th ed. 2014).

2. *See* W.P. Schultz & H.M. Shearin, *Injection Operations*, *in* PETROLEUM ENGINEERING HANDBOOK 42-1, 42-1 (Howard B. Bradley ed., 3d ed. 1992).

3. ENHANCED OIL RECOVERY: SECONDARY AND TERTIARY METHODS 4-5 (M.M. Schumacher ed., 1978).

4. *Id.*

petroleum engineering, Dr. Charles Haynes[5] and Wayne Stafford.[6]

Dr. Haynes believes that numerous oil and gas fields and reservoirs around the country could be utilized for enhanced recovery operations. He states that when certain geologic and engineering conditions are present, producers should initiate enhanced recovery operations to ensure that the maximum amount of oil and gas is produced from a field or reservoir. Stafford agrees and, through his experience, has reached three simple conclusions. First, he believes that virtually every oil and gas field or reservoir could benefit from enhanced recovery operations. Second, he finds that early initiation of enhanced recovery operations increases ultimate production in a field or reservoir.[7] Finally, Stafford states that enhanced recovery operations initiated late in the development of a field or reservoir still increase its ultimate productivity. These conclusions underscore the importance of technological innovation in the oil and gas industry. As petroleum demand continues to increase, especially in light of emerging energy markets in countries such as China and India, the industry must continue to meet the consumption needs of a global economy.

III. FIELDWIDE UNITIZATION

Almost every state has enacted laws allowing the state to require unitization of all or part of a field for enhanced recovery operations.[8] To avoid confusion, it is important to distinguish the terms "pooling" and "unitization." Although many use the terms interchangeably, "pooling" refers to the process by which "[a]n owner of . . . a small or irregular tract may enter into an

5. Dr. Haynes is a retired petroleum engineer whose companies drilled oil and gas wells and conducted enhanced recovery operations in numerous states. He obtained his Ph.D. at the University of Texas and previously served as Assistant Dean of the University of Alabama College of Engineering.

6. Mr. Stafford received a petroleum engineering degree from Mississippi State University. He has worked on enhanced recovery projects across the country.

7. Petroleum engineering treatises support early implementation of enhanced recovery operations, which has become the standard practice in the industry. For example, "the development plans of most new discoveries include the option of initiating injection operations right from the start." Schultz & Shearin, *supra* note 2, at 42-1.

8. *See, e.g.*, ALA. CODE §§ 9-17-80 to -88 (2015); ARK. CODE ANN. §§ 15-72-308 to -310, 15-72-313 to -315 (Repl. 2009); OKLA. STAT. ANN. tit. 52, §§ 287.1–.13, 287.15 (West 2015). Many of these state laws are based on model legislation promulgated by the IOGCC.

agreement to 'pool' the tract with other tracts belonging to adjacent owners, thereby conforming to the spacing pattern and securing the opportunity of recovering a share of the oil and gas."[9] Conversely, "unitization" describes "a consolidation of a sufficient majority of the royalty and working interests in a geological pool that permits the reservoir engineers to plan operation of the pool as a natural energy mechanism."[10] This article limits its discussion of unitization to the United States, but the concept applies internationally.[11] Much of the following discussion builds on the work of the IOGCC when the organization drafted its model legislation.[12]

A. Primary Operations

Understanding unitization requires a discussion of field development. This process typically begins with what is known in the industry as "primary operations," which generally commence with the drilling of an exploratory well.[13] These first wells, sometimes called "wildcat" wells, are drilled in locations not yet known to produce marketable amounts of oil and/or gas.[14] When drilling a wildcat well, the operator must comply with all state laws, as well as regulations promulgated by that state's oil and gas regulatory authority.[15] Should an exploratory well produce oil and/or gas, the operator will drill additional wells and conduct geologic tests "to determine the nature and extent of the oil and gas field."[16]

Before an operator may permanently extract oil and/or gas from the field, he must file a petition with the Commission.[17] The Commission will then conduct a public hearing to establish

---

9. 1 NANCY SAINT-PAUL, SUMMERS OIL AND GAS § 5.2 (3d ed. 2004).

10. 4 *id.* § 54:1.

11. *See, e.g.*, Petroleum Licensing (Production) (Seaward Areas) Regulations, 2008, S.I., 2008/225, art. 2, ¶ 27 (U.K.), *available at* http://www.legislation.gov.uk/uksi/2008/225/pdfs/uksi_20080225_en.pdf (entitled "Unit development").

12. The author chaired the "work group" that drafted the model code. INTERSTATE OIL & GAS COMPACT COMM'N, IOGCC MODEL STATUTE AND FIELDWIDE UNITIZATION REFERENCES 6 (1999), *available at* http://iogcc.publishpath.com/Websites/iogcc/docs/iogcc_model_statute_and_fieldwide_unitization_references.pdf.

13. *Id.* at 3.

14. *See id.*

15. *Id.* For consistency, this article refers to this regulatory body as the "Commission."

16. *Id.*

17. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 3.

a field, and, once established, the Commission will adopt a set of field rules to govern development of the new "field."[18] Alabama law defines a "field" as "[t]he general area which is underlain or appears to be underlain by at least one pool, and such term shall include the underground reservoir or reservoirs containing crude oil or natural gas or both."[19] Other jurisdictions employ similar definitions.[20] While the Commission's field rules most notably establish geographic boundaries, they also set forth various requirements that apply to every well drilled in the field.[21] For example, the current IOGCC Model Oil and Gas Conservation Act requires a spacing or production unit to "consist of the maximum area of a reservoir that may be efficiently and economically drained by one well."[22] Adopting states have endorsed this definition.[23]

Well-spacing laws and regulations may apply to an entire 640-acre governmental section or to a portion thereof, such as 40, 160, or 320 acres.[24] After the Commission establishes the field and adopts field rules, operations on the field may begin. Primary operations usually consist of methods such as flowing, pumping, and lifting.[25] During this time, working interest owners are entitled to their proportionate production revenues—often in the form of royalties—from the oil and/or gas produced from the field.[26]

---

18. *Id.* at 3-4.

19. ALA. CODE § 9-17-1(5) (2015).

20. *See, e.g.*, ARK. CODE ANN. § 15-72-102(2)(A) (Repl. 2009) ("'Field' means the general area which is underlaid or appears to be underlaid by at least one (1) pool. 'Field' includes the underground reservoir or reservoirs containing crude petroleum oil or natural gas, or both.").

21. For example, in this symposium issue, Thomas Daily explores the Arkansas Oil and Gas Commission's field rules for development in the Fayetteville Shale play. *See* Thomas A. Daily, *Rules Done Right: How Arkansas Brought Its Oil and Gas Law into a Horizontal World*, 68 ARK. L. REV. 259 (2015).

22. MODEL OIL & GAS CONSERVATION ACT § 10(a) (Interstate Oil & Gas Compact Comm'n 2004).

23. *See, e.g.*, ALA. CODE § 9-17-1(3) (2015) (defining "drainage or production unit" as "[t]he area in a pool which may be drained efficiently and economically by one well").

24. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 4.

25. 1 SAINT-PAUL, *supra* note 9, § 1.7.

26. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 4.

B. Unit Operations for Enhanced or Secondary Recovery

Due to the finite and fugacious nature of oil and gas, primary operations will eventually cease to produce at a commercially viable rate. Engineering and legal complexities also limit the practicality of primary operations on land that does not encompass the entire common pool or reservoir.[27] This necessitates the initiation of "enhanced," or "secondary," recovery operations.[28] One prominent treatise on oil and gas defines these operations as "the production of oil which is obtained by the injection of gas, air, water or another substance into the reservoir for the maintenance, increase or renewal of the reservoir pressure."[29] However, before enhanced recovery operations may begin, the field must undergo unitization.[30]

The goal of pooling and unitization, or "unit operations," is to prevent the drilling of unnecessary wells and to increase the production of oil and gas from a particular field.[31] Enhanced recovery also promotes three important goals of conservation legislation: (1) the prevention of waste; (2) the conservation of oil and gas resources; and (3) the protection of correlative rights.[32] Unitization allows a fieldwide unit to be economically developed in order to "maximize the efficient production of oil and gas."[33] Oil and gas regulations in the various states achieve unitization by combining separate tracts of land into a single unit overlying a common source of supply.[34]

Prior to unitization, the typical field has already been developed, and its boundaries are often well defined.[35] Operators have likely recorded voluminous geological, engineering, and production data on the field since the primary

27. 1 SAINT-PAUL, *supra* note 9, § 1.8.

28. *Id.* § 1.7.

29. *Id.*

30. *Id.* § 1.8 ("Unit operation, however, requires the integration or unitization of the interests of all lessors, lessees and royalty owners in the pool.").

31. *See* 6 PATRICK H. MARTIN & BRUCE M. KRAMER, WILLIAMS & MEYERS OIL AND GAS LAW § 901 (rev. ed. 2014).

32. *See id.*; *see also* Bruce M. Kramer & Owen L. Anderson, *The Rule of Capture—An Oil and Gas Perspective*, 35 ENVTL. L. 899, 901 (2005) (noting these goals of conservation regulation).

33. 1 SAINT-PAUL, *supra* note 9, § 1.8.

34. *See id.*

35. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 4.

operations commenced.[36] The elimination of individual units and creation of a single fieldwide unit necessarily alters the amount of production revenues that each mineral interest owner receives.[37] After unitization occurs, mineral interest owners in the field no longer receive production revenues based on oil and gas produced from a well on an individual unit; instead, they receive revenues based on an allocation formula approved by the Commission.[38]

The allocation formula is intended to optimize "the equitable distribution of revenue."[39] A truly equitable distribution is unattainable when initial production begins on the field because of a lack of geologic knowledge about the reservoir's productive capability.[40] Unitization corrects the "potential inequities" associated with primary operations, which in turn protects the correlative rights of mineral interest owners in the field.[41]

Following unitization, enhanced recovery operations may begin. Enhanced recovery often involves "[t]he establishment of gas-oil ratios, spacing and location of wells on the structure, maintenance of back pressure on oil wells, cycling and recycling of gas, and the introduction of gas, water or other substance into the producing formation for the maintenance or renewal of reservoir pressures."[42] These operations alter reservoir pressure in order to force oil and/or gas toward wells where the resources can be most efficiently produced.[43]

Unitization produces substantial benefits.[44] Primary operations typically recover 10% to 30% of the total oil and gas

---

36. *Id.*; *see also* 1 BRUCE M. KRAMER & PATRICK H. MARTIN, THE LAW OF POOLING AND UNITIZATION § 17.01 (3d ed. 2014) ("Before unitization can be achieved, substantial amounts of geological, geophysical, economic, financial, and other data must be collected and digested to see if the unitization project is feasible.").

37. 4 SAINT-PAUL, *supra* note 9, § 55:4.

38. *Id.*

39. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 5.

40. *Id.*

41. *Id.*

42. 1 SAINT-PAUL, *supra* note 9, § 1.8.

43. *Id.* § 1.7.

44. Note that statutes in some states allow unitization for purposes other than enhanced recovery. The relevant Alabama statute, for example, provides that unit operations may be conducted "in order to increase the ultimate recovery by enhanced recovery methods or any other method of cooperative development and operation calculated to increase the ultimate recovery of oil or gas." ALA. CODE § 9-17-81 (2015). Unitization may be implemented during primary operations of oil and gas development.

in an underground reservoir.[45] Enhanced recovery techniques frequently increase this figure by 30% to 60%, and occasionally by more than 100%.[46] This improves the outcomes for all parties. Instead of relying on one well producing under primary operations, owners can participate in the wells across the entire unit.[47] This stabilizes the incomes that diminish as primary production dwindles and prolongs the income stream from production.[48] Moreover, the state benefits through the prevention of waste and the conservation of oil and gas for use by future generations.[49]

C. The IOGCC Model Unitization Statute

In 1999, the IOGCC adopted a Model Unitization Statute.[50] Section A of the model law provides the jurisdictional basis for a Commission order:

> A. The oil and gas conservation agency shall issue an order requiring unit operations, if it finds that:
>
> 1. Operation of the pool or any portion thereof is necessary to prevent waste, to increase the recovery of oil or gas, to avoid the drilling of unnecessary wells, and to protect the correlative rights of the owners of the oil and gas;
>
> 2. The unit operation of the pool or any portion thereof is reasonably necessary in order to carry on pressure maintenance or repressuring, cycling, water flooding, any combination of these operations, or any other method of cooperative development and operation which increases the ultimate recovery of oil or gas.

For example, unitization has been utilized during primary operations for offshore exploration, coalbed gas operations, and horizontal drilling.

45. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 5.

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.* *See generally* 1 KRAMER & MARTIN, *supra* note 36, §§ 17.01–18.04 (discussing voluntary and compulsory unitization); 6 MARTIN & KRAMER, *supra* note 31, § 912 (discussing the history of compulsory unitization and the enactment of compulsory unitization statutes in several states).

50. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 10-13. This model legislation is reproduced in Appendix A.

> 3. The estimated cost of conducting the unit operation will not exceed the value of the estimated recovery of oil or gas.[51]

Section B sets forth the provisions a Commission order must include.[52] Among these provisions is an allocation formula, which governs the distribution of proceeds and expenses from production.[53] Because the Commission's decisions on these formulae are rarely overturned, the determination of a fair and reasonable allocation formula is often the most contentious issue at the unitization hearing.[54] The Model Unitization Statute provides guidance on this issue by stating that the order must "be upon terms and conditions that are just and reasonable for unit operations and . . . include . . . [a] description of the pool or portion thereof, to be so operated, termed the unit area."[55]

D. Unit Area

The unit area is extremely important because only those tracts and interests included in the unit area receive production revenues.[56] Tracts or portions of tracts may be included within the unit area as long as they contribute to unit production. The decision of the Alabama Court of Civil Appeals in *State Oil & Gas Board v. Anderson*[57] illustrates this principle. In the case, the court held that the Alabama Oil and Gas Board had the power to unitize an entire oil field, not just "those areas of the field that ha[d] currently producing wells."[58]

---

51. MODEL UNITIZATION STATUTE § A-1 to -3 (Interstate Oil & Gas Compact Comm'n 1999).

52. *See* MODEL UNITIZATION STATUTE § B (Interstate Oil & Gas Compact Comm'n 1999).

53. *See* 4 SAINT-PAUL, *supra* note 9, § 55:4.

54. *See* 1 KRAMER & MARTIN, *supra* note 36, § 17.02[5][a].

55. MODEL UNITIZATION STATUTE § B (Interstate Oil & Gas Compact Comm'n 1999).

56. *See* 4 SAINT-PAUL, *supra* note 9, § 54:8.

57. 510 So. 2d 250 (Ala. Civ. App. 1987).

58. *Id.* at 255-56.

E. Allocation Formula

Complicating the negotiation of the unit agreement is the allocation formula.[59] The formula—which governs the distribution of revenues from unit production—is a matter of crucial concern to royalty interest owners.[60] Because no single method is appropriate for every field, allocation formulae vary substantially.[61] The Model Unitization Statute states that a Commission's unitization order must constitute "[a] just and reasonable allocation to the separately owned tracts in the unit area of all oil and gas that is produced and saved from the unit area, being the production that is not used in the conduct of operations on the unit area or not unavoidably lost."[62]

An allocation formula that is acceptable to the royalty interest owners and other owners in the field will depend upon a number of factors. These factors include the development of the reservoir, geologic and reservoir characteristics, and the production history of the tracts.[63] A tract with greater reserves and greater productive capacity, for example, will be given more weight in the formula than a tract with less reserves and a lower productive capacity.[64]

If the parties cannot agree on the allocation formula, the Commission must resolve the issue. One of the principal duties of the Commission is to protect correlative rights.[65] Further, the Commission is bound by the Model Unitization Statute to approve a formula.[66] The model law addresses contributions that each *tract* is expected to make.[67] In *Anderson*, the court determined that the Model Unitization Statute's "productivity factor" was meant to consider not what a single *well* is expected

---

59. 1 KRAMER & MARTIN, *supra* note 36, § 17.02[5][a]. The allocation formula is sometimes referred to as the participation formula.

60. *Id.*

61. *Id.*

62. MODEL UNITIZATION STATUTE § B-3 (Interstate Oil & Gas Compact Comm'n 1999).

63. 1 KRAMER & MARTIN, *supra* note 36, § 17.02[5][a].

64. INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 42.

65. *Id.* at 7.

66. *See* MODEL UNITIZATION STATUTE § B-3 (Interstate Oil & Gas Compact Comm'n 1999).

67. MODEL UNITIZATION STATUTE § B-3 ("A just and reasonable allocation to the separately owned tracts in the unit area of all oil and gas that is produced and saved from the unit area, being the production that is not used in the conduct of operations on the unit area or not unavoidably lost.").

to contribute, but rather what each entire *tract* will contribute.[68] Thus, the characteristics of a single well—such as its production history, capacity, and pore volume—represent only some of the relevant evidence as to what the entire tract will contribute.[69]

The Model Unitization Statute allows the parties to propose a multi-factor allocation formula. For example, in *Gilmore v. Oil & Gas Conservation Commission*,[70] the Wyoming Supreme Court upheld a formula containing eleven factors.[71] In *State Oil & Gas Board v. Seaman Paper Co.*,[72] the Alabama Supreme Court upheld a formula allocating "two-thirds weight to 'Productive Acre Feet' . . . and one-third weight to production for the last six months."[73] The court in *Anderson* upheld a formula that gave 60% weight to pore volume and 40% based on productivity.[74] These cases demonstrate the Commission's broad authority to approve allocation formulae. A list of the allocation formulae for every oil and gas reservoir in Alabama is attached as Appendix B.[75] Note that virtually all of the formulae include hydrocarbon pore volume as all or part of the formula.

F. Unit Agreement

The unit agreement is a contract between working interest owners, royalty interest owners, and any unleased mineral interest owners.[76] It must be entirely consistent with applicable statutes and must include all statutorily required provisions.[77] For example, the Model Unitization Statute allows for extensions of the unit area upon ratification by a certain percentage of working and royalty interest owners in the

68. State Oil & Gas Board v. Anderson, 510 So. 2d 250, 255 (Ala. Civ. App. 1987).

69. *See id.* at 253-55.

70. 642 P.2d 773 (Wyo. 1982).

71. *Id.* at 775, 780.

72. 235 So. 2d 860 (Ala. 1970).

73. *Id.* at 870.

74. *Anderson*, 510 So. 2d at 253-54.

75. The author appreciates the assistance of Randy Oglesby, Geologist, State Oil and Gas Board of Alabama, and Irene Burgess, Executive Secretary, State Oil and Gas Board of Alabama, in compiling this list of allocation formulae.

76. *See* Jacqueline Lang Weaver & David F. Asmus, *Unitizing Oil and Gas Fields Around the World: A Comparative Analysis of National Laws and Private Contracts*, 28 HOUS. J. INT'L L. 3, 17 (2006).

77. *See id.*

proposed extended area.[78] Any provision to the contrary—such as one giving the parties in the present unit a "veto power" over any addition—would be inconsistent with the Model Unitization Statute.

The unit agreement also addresses the effect of unitization on the parties' preexisting leases or agreements. The unit agreement normally will address the unit operator's right to use unitized substances for unit operations. Generally, unit agreements provide for the use of such substances without a royalty obligation, such as where the substance was lost or consumed in operations.

G. Ratification

Section C-1 of the Model Unitization Statute provides as follows:

> An order requiring unit operation shall not become effective, unless and until a unitization agreement approved by the oil and gas conservation agency has been signed and approved or ratified in writing by the owners of at least ___ percent as costs are shared under the terms of the allocation formula and by ___ percent of the royalty owners excluding the owners of overriding royalties, production payments, and any other interest carved out of the working interest in the unit area as revenues are distributed under the terms of the allocation formula.[79]

The percentages required for ratification vary by state. For example, Oklahoma requires 63%;[80] Arkansas requires 75%;[81] Montana requires 60%;[82] and Alabama requires 66.67%.[83] In the event a Commission order providing for unitization is ratified, the Commission will conduct a hearing and make a finding to that effect.[84]

---

78. MODEL UNITIZATION STATUTE § C-2 (Interstate Oil & Gas Compact Comm'n 1999).

79. MODEL UNITIZATION STATUTE § C-1.

80. OKLA. STAT. ANN. tit. 52, § 287.5 (West 2015).

81. ARK. CODE ANN. § 15-72-309 (Repl. 2009).

82. MONT. CODE ANN. § 82-11-204 (West 2015).

83. *See* ALA. CODE § 9-17-84 (2015).

84. *See* INTERSTATE OIL & GAS COMPACT COMM'N, *supra* note 12, at 49; *see also* 1 KRAMER & MARTIN, *supra* note 36, § 17.03.

H. Effect of Unitization on Oil and Gas Leases

The unit agreement modifies existing oil and gas leases. Unitization entitles the lessor to a royalty interest based upon the share of production attributable to his interest in the allocation formula, regardless of whether the production is from wells drilled on his lands, on a spacing unit that includes his lands, or from other tracts in the unit.[85] Production from unit operations perpetuates the lease after its primary term expires.[86] Further, unless the lease or the unit agreement states otherwise, the production from unit operations holds and maintains lands leased outside the unit area.[87] To the extent the unitization agreement does not alter the lease, the relationship between the lessor and the lessee remains governed by the express and implied covenants in the lease.[88]

I. Cases Addressing Fieldwide Unitization

1. Factors Included in Allocation Formulae

In *Gilmore v. Oil & Gas Conservation Commission*,[89] the Wyoming Supreme Court upheld an allocation formula containing eleven factors.[90] The formula barely received the 75% approval required for ratification.[91] The factors included Usable Wells, First Six Months Production, Peak Rate, Wellbore Net Feet, Last Three Months Production, Last Six Months Production, Remaining Primary, Ultimate Primary, Developed Porosity Acre Feet, and Porosity Acre Feet.[92] In upholding the formula, the court noted that waste would occur by delaying secondary recovery operations.[93] Weighing this concern against protection of the parties' rights, the court made the following statement: "We are faced with a delicate balancing problem

85. Weaver & Asmus, *supra* note 76, at 20-21.

86. *Id.* at 21.

87. *See id.*

88. *See* 6 MARTIN & KRAMER, *supra* note 31, §§ 950–64 (explaining how pooling and unitization affect oil and gas leases).

89. 642 P.2d 773 (Wyo. 1982).

90. *Id.* at 775, 780.

91. *Id.* at 775.

92. *Id.*

93. *Id.*

between prevention of waste and correlative rights, but prevention of waste is of primary importance."[94]

2. Ambiguous Allocation Formulae Requiring Inequitable Payments

In *Williams v. Arkansas Oil & Gas Commission*,[95] the Arkansas Oil and Gas Commission issued an order approving a proposed unitization plan for secondary recovery operations.[96] The plan included a two-phase allocation process that applied one formula during primary operations and a different formula during secondary recovery operations.[97] The Arkansas unitization statute provided that the formula shall be "based on the relative contribution to the unit operation . . . made by each separately owned tract or previously established drilling unit."[98] Arkansas law also required allocation orders to be "fair and reasonable."[99] Several working interest owners appealed the order, claiming the formula was "ambiguous and potentially represented a gross inequity."[100] On appeal, the Arkansas Supreme Court reviewed the complicated formula in detail. The court ultimately stated, "[t]he formula, if interpreted to require the [plaintiffs] to pay expenses at a higher percentage rate than their percentage share in production, would violate the statute."[101] The court reversed the Commission, holding the formula violated the state's oil and gas conservation act.[102]

3. Delegation and Ratification

In *State Oil & Gas Board v. Seaman Paper Co.*,[103] the Alabama Supreme Court upheld a unitization order and ruled on

94. *Gilmore*, 642 P.2d at 779.

95. 307 Ark. 99, 817 S.W.2d 863 (1991), *overruled by* Great Lakes Chem. Corp. v. Bruner, 368 Ark. 74, 243 S.W.3d 285 (2006).

96. *Id.* at 100, 817 S.W.2d at 864.

97. *Id.* at 107, 817 S.W.2d at 867-68.

98. ARK. CODE ANN. § 15-72-310(2) (Repl. 2009).

99. ARK. CODE ANN. § 15-72-310.

100. *Williams*, 307 Ark. at 108, 817 S.W.2d at 868.

101. *Id.* at 111, 817 S.W.2d at 870.

102. *Id.* The Arkansas Supreme Court later reversed *Williams* in *Great Lakes Chemical Corp. v. Bruner*, holding that in reviewing Commission orders, the court can only allow evidence to be introduced at the trial court level in limited circumstances. *See* 368 Ark. 74, 84, 243 S.W.3d 285, 292 (2006).

103. 235 So. 2d 860 (Ala. 1970).

issues involving delegation and ratification.[104] The court first rejected a claim that the Commission had improperly delegated its allocation authority to the unit manager, instead finding that the Commission had incorporated the required allocations into the challenged order.[105] The court then affirmed the allocation formula approved by the Commission, relying on the testimony of the unit manager to establish that the requisite number of interest owners had ratified the formula.[106]

IV. CONCLUSION

Although fieldwide unitization can be complicated, the role of the Commission is simple—to treat all parties fairly. To conclude, I wish to quote Dean Albert Farrah, who served as dean of the University of Alabama School of Law for thirty-two years and who taught constitutional law to both my father and uncle. He frequently told law graduates and others: "[W]hat was law and justice for the poor man in his cottage was not always law and justice for the Rockefellers, the Armours and the Carnegies. . . . But . . . [e]qual, exact and universal justice have been restored to their former place in Uncle Sam's government."[107]

104. *Id.* at 869-70.

105. *Id.* at 869.

106. *Id.* at 877-78.

107. Albert John Farrah, An After Dinner Address at Dean's Family Reunion—Chase (n.d.), *in* ALBERT JOHN FARRAH, ADDRESSES, PAPERS AND LETTERS: 1863–1944, at 58, 59 (1985) (internal quotation marks omitted).

APPENDIX A

MODEL UNITIZATION STATUTE

The oil and gas conservation agency upon its own motion, or upon the petition by any interested party, shall conduct a hearing to consider the need for the operation as a unit of an entire pool or any portion thereof, in order to increase ultimate recovery of oil or gas from the pool or any portion thereof.

A. The oil and gas conservation agency shall issue an order requiring unit operations, if it finds that:

    1. Operation of the pool or any portion thereof is necessary to prevent waste, to increase the recovery of oil or gas, to avoid the drilling of unnecessary wells, and to protect the correlative rights of the owners of the oil and gas;

    2. The unit operation of the pool or any portion thereof is reasonably necessary in order to carry on pressure maintenance or repressuring, cycling, water flooding, any combination of these operations, or any other method of cooperative development and operation which increases the ultimate recovery of oil or gas.

    3. The estimated cost of conducting the unit operation will not exceed the value of the estimated recovery of oil or gas.

B. The order issued by the oil and gas conservation agency shall be upon terms and conditions that are just and reasonable for unit operations and shall include:

    1. A description of the pool or portion thereof, to be so operated, termed the unit area;

    2. A statement of the nature of the operations contemplated;

3. A just and reasonable allocation to the separately owned tracts in the unit area of all oil and gas that is produced and saved from the unit area, being the production that is not used in the conduct of operations on the unit area or not unavoidably lost;

4. A provision for the credits and charges to be made in the adjustment among the owners in the unit area for their interest in wells, tanks, pumps, machinery, materials, and equipment contributed to the unit operations;

5. A provision providing how the costs of unit operations, including capital investments and costs of unit termination, shall be determined and charged to the separately owned tracts and how said costs shall be paid, including a provision providing when, how, and by whom the unit production allocated to an owner who does not pay the share of the cost of unit operations charged to such owner, or the interest of such owner, may be sold and the proceeds applied to the payment of such costs;

6. A provision, if necessary, for carrying or otherwise financing any person who elects to be carried or otherwise financed, allowing a reasonable charge for such service payable out of such person's share of the production;

7. A provision for the supervision and conduct of the unit operations, in respect to which each owner shall have a vote with a value corresponding to the percentage of the costs of unit operations chargeable against the interest of such owner;

8. The time when the unit operations shall commence, and the manner in which, and the circumstances under which, the unit operations and the unit shall terminate and be dissolved;

9. Such additional provisions that are found to be appropriate for carrying on the unit operations, and

for the prevention of waste and protection of correlative rights.

C. General Provisions:

1. An order requiring unit operation shall not become effective, unless and until a unitization agreement approved by the oil and gas conservation agency has been signed and approved or ratified in writing by the owners of at least ____ percent as costs are shared under the terms of the allocation formula and by ____ percent of the royalty owners excluding the owners of overriding royalties, production payments, and any other interest carved out of the working interest in the unit area as revenues are distributed under the terms of the allocation formula.

2. The oil and gas conservation agency may approve additions to the unit portions of pools not previously included within the unit and may extend the unit area as necessary. The oil and gas conservation agency may approve reductions to the unit area as necessary. An order adding to or deleting from the unit area shall be upon terms that are just and reasonable. An order providing for an addition has been approved by the owners of at least ____ percent as costs are shared in the area to be added to unit operation under the terms of the order and by [____] percent of the royalty owners in the area to be added as revenues are distributed under the terms of the order, and the oil and gas conservation agency has made a finding to that effect. An order providing for a deletion to the unit area shall not become effective unless and until approved by the owners of at least ____ percent as costs are shared under the terms of the allocation formula and by ____ percent of the royalty owners in the original unit area have approved of the deletion.

3. An order may provide for unit operations on less than the whole of a pool, where the unit area is of such size and shape as may be reasonably required for that

purpose and the conduct thereof will have no significant adverse effect upon other portions of the pool.

4. All operations, including, but not limited to, the commencement, drilling, or operation of a well upon any portion of the unit area shall be deemed for all purposes the conduct of such operations upon each separately owned tract in the unit area by the several owners thereof. The portion of the unit production allocated to a separately owned tract in a unit area shall, when produced, be deemed, for all purposes, to have been actually produced from such tract by a well drilled thereon. Operations conducted pursuant to an order of the oil and gas conservation agency providing for unit operations shall constitute a fulfillment of all the express or implied obligations of each lease or contract covering lands [i]n the unit area to the extent that compliance with such obligations cannot be had without the order of the oil and gas conservation agency.

5. Except to the extent that the parties affected so agree, no order providing for unit operations shall be construed to result in a transfer of all or any part of the title of any person to the oil and gas rights in any tract in the unit area.

6. The oil and gas conservation agency, upon its own motion, or upon the petition by any owner may for good cause terminate unit operation and dissolve the unit.

7. An agreement in the interest of conservation of oil or gas and for the prevention of waste for pressure maintenance or repressuring operations, cycling operations, water flooding operations, any combination of these operations, or any other method of unit or cooperative development and operation of a pool, or any portion thereof, is authorized and shall not be held or construed to violate any statutes

relating to trusts, monopolies, or contracts and combinations in the restraint of trade.

APPENDIX B

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Aloe Bay (Norphlet)	Each tract's productive share of net productive acre-feet.	92-136
Appleton (Smackover)	50% acre-feet of hydrocarbon pay and 50% daily average production from May 1, 1985, through Dec. 31, 1987.	
Blowhorn Creek (Millerella)	Average of sum of each tract's proportionate share of total oil pore volume and well credit calculated by dividing number of wells capable of contributing to Unit production in each tract by total number of wells in Unit Area.	87-56
Bon Secour Bay (Norphlet)	100% of each tract's proportionate share of net productive acre-feet (porosity greater than 8%).	92-3
Catawba Springs (Norphlet)	Each tract's proportionate share of total hydrocarbon pore volume in the Unit Area.	86-291
Central Bluff Upper Carter (Carter)	Each tract shares equal value in Unit Area (three tracts at 33.33%).	92-22
Central Fairview (Carter)	48.75% net oil pore volume, 1.25% net gas pore volume and 50% usable well bores.	89-56 and 89-102
Chatom (Smackover)	75% original hydrocarbon-bearing acre-feet and 25% total number of productive wells.	76-31 and 76-31A

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Chavers Creek (Norphlet)	Each tract's proportionate share of total Unit remaining recoverable reserve (original recoverable reserve less cumulative production as of June 30, 1987).	87-203
Choctaw Ridge (Smackover)	Remaining commercial oil to be recovered.	74-18(E)
Chunchula (Smackover)	50% net pore volume and 50% well deliverability based on average daily BTU value obtained during three-day stabilized production flow test.	81-1
Citronelle (Rodessa)	Six months production from August 1, 1959, through January 31, 1960, or 6 months production immediately prior to effective date of enlargement; 1/3 microlog acre-feet; and 1/3 oil-in-place equivalent acre-feet.	166
Crosbys Creek (Smackover)	50% net hydrocarbon pore volume and 50% cumulative production based on cumulative production prior to unitization.	2010-112
East Citronelle (Upper and Lower Donovan)	Phase I: best 6 months production from Nov. 1, 1963, through Aug. 30, 1964, or equivalent acre-foot potential productivity if less than 6 months production available. Phase 2 (effective after 2,200,000 barrels oil produced): oil-in-place equivalent acre-feet.	64-32 and 65-8
East Excel (Smackover–horizontal only)	100% mineral-acre ownership.	2013-99

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
East Frisco City (Frisco City Sand)	50% of each tract's remaining oil-in-place divided by total remaining oil-in-place in the entire unit, plus 50% for each tract's capable producible well currently capable of producing hydrocarbons in paying quantities divided by the total number of such wells in the unit.	97-98
East Gilbertown Eutaw (Eutaw)	50% production during 1972 and 1973 and 50% net pay.	74-50
East Haynesville (East Haynesville Sand)	50% cumulative tract production and 50% productive reservoir volume.	99-100
East Mississippi Sound (Amos)	100% of each tract's proportionate share of net productive acre-feet.	95-290
East Womack Hill (Smackover)	50% surface acreage ownership and 50% net pay computed in acre-feet.	2005-63
Fairway (Norphlet)	100% surface acres.	91-179 and 91-344
Fanny Church–Upper Smackover Reservoir (Smackover)	45% porosity acre-feet and 55% well factor.	84-443

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Foshee (Tuscaloosa–Pilot)	Each tract's proportionate share of total productive acre-feet in the Unit Area.	88-10
Frisco City (South Frisco City Sand)	50% of each tract's proportionate share of original productive acre-feet of net oil pay and 50% of each tract's proportionate share of producing wells currently capable of producing hydrocarbons in paying quantities.	2000-70 and 2000-70A
Gin Creek Oil Unit	One-third (1/3) credit for the net hydrocarbon pore volume underlying that tract, one-third (1/3) credit for a producing well within the tract, and one-third (1/3) credit for the projected ultimate oil production from the tract.	2014-14
Gilbertown (Eutaw Sand)	Total cumulative oil produced through Nov. 1, 1995.	96-78
Goose Bayou (Amos)	Each tract's proportionate share of total surface acreage within the Unit Area.	96-24
Hall Creek (Norphlet Oil Pool)	Each tract's proportionate share of total hydrocarbon pore volume in Unit Area.	87-33
Hatter's Pond (Smackover-Norphlet)	60% pore volume and 40% productivity with productivity defined as a tract's average daily production rate as determined from a well's best month of production on the tract.	83-170
Hickory Branch (Haynesville Sand)	Percentage of surface acres times estimated secondary reserves for Unit plus each tract's remaining primary reserves divided by total estimated remaining reserves for Unit.	94-199 and 95-117
Langsdale (Eutaw)	100% productive area.	67-3

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Little Cedar Creek Oil Unit I (Smackover)	Phase 1: 50% hydrocarbon pore volume and 50% well productivity; Phase 2: 50% hydrocarbon pore volume.	2004-140
Little Cedar Creek Oil Unit Enlargement (Smackover)	Phase 1: 50% hydrocarbon pore volume and 50% well productivity; Phase 2: 50% hydrocarbon pore volume.	2006-79
Little Cedar Creek Oil Unit 2d Enlargement (Smackover)	Phase 1: 50% hydrocarbon pore volume and 50% well productivity; Phase 2: 50% hydrocarbon pore volume.	2007-12
Little Cedar Creek Oil Unit 3d Enlargement (Smackover)	Phase 2: 100% hydrocarbon pore volume per acre-foot.	2014-70
Little Cedar Creek Oil Unit II (Smackover)	Phase 1: 50% hydrocarbon pore volume; Phase 2: 50% well productivity.	2014-23 2014-43
Little Escambia Creek (Smackover-Norphlet)	Phase 1 (ends when total cumulative production equals producible primary reserves): 50% average daily production and 50% productive acres; Phase 2: 100% porosity-acre-feet (equal to or greater than 8%).	73-61
Lower Mobile Bay-Mary Ann (Norphlet)	100% net productive acre-feet.	82-244

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Monroeville (Frisco City Sand)	50% well productivity factor and 50% pore volume acre-feet.	96-102
Mud Creek (Millerella)	Average of sum of each tract's proportionate share of net oil pore volume and usable wellbore credit as of Sept. 1, 1988.	90-19
North Blowhorn Creek (Carter)	50% adjusted net oil pore volume (total less Feb. 1, 1982, cumulative production) expressed in acre-feet and 50% usable wellbore credit (any well capable of producing an average of 35 BOPD or more during first 30 days of production received full credit) as of April 20, 1982– usable wellbore credit of any well drilled and completed subsequent to April 20, 1982, equivalent to ratio of its average daily production during first 30 days bears to 35 BOPD; usable wellbore credit to any gas well to be determined by Unit Engineering Subcommittee.	83-40
North Central Gulf (Norphlet) Tract 114	100% of each tract's proportionate share of net productive acre-feet.	92-333
North Central Gulf (Norphlet) Tracts 115 and 116	100% of each tract's proportionate share of net productive acre-feet.	92-201
North Citronelle Unit (Rodessa)	Original reserves less cumulative production.	2013-83

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
North Dauphin Island (Dauphin)	Each tract's proportionate share of hydrocarbon-bearing net acre-feet underlying the total Unit Area.	91-181 and 91-444
North Fairview (Carter)	50% net oil pore volume and 50% usable well bore.	93-85
North Frisco City (Frisco City Sand)	50% well productivity and 50% productive acre-feet.	94-79 and 94-198
North Monroeville (Frisco City Sand)	50% well productivity and 50% productive reservoir volume.	98-71
Northeast Petit Bois Pass (Dauphin)	Sum of the percentages obtained by multiplying the working interest of each working interest owner in each tract within the Unit Area by the Tract Participation of such tract.	96-74
Northwest Citronelle (Rodessa)	Estimated remaining reserves (primary and secondary) to be produced based on original reserves less cumulative production through Nov. 30, 1978.	79-62
Northwest Citronelle Unit Enlargement	Estimated remaining reserves (primary and secondary) to be produced based on original reserves less cumulative production through Nov. 30, 1978.	91-239
Northwest Dauphin Island (Dauphin)	Each tract's proportionate share of hydrocarbon-bearing acre-feet underlying the total Unit Area.	91-472

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Northwest Gulf (Norphlet)	Phase 1: each tract's proportionate share of total productive surface acres. Phase 2 (effective first day of month following date tract participating interests approved, or initiation of production): each tract's proportionate share of total original net hydrocarbon gas in place; planned redeterminations.	87-138
Pleasant Home (Hosston)	Each tract's proportionate share of the total net productive acre-feet underlying the Unit Area.	96-157
Saxon Bay (North Meyer Sand)	Each tract's proportionate share of net productive surface acres in the Unit Area.	99-29
Silas (Smackover)	100% surface acres.	76-90
Sizemore Creek–Norphlet (Norphlet)	Each tract's proportionate share of the pore volume underlying the total Unit Area.	86-68 and 86-69
South Brush Creek (Carter)	Each tract's proportionate share of net oil pore volume (acre-feet) in the Unit Area.	88-206 and 88-255
South Carlton (Lower Tuscaloosa)	Each tract's proportionate share of total unitized productive net volume.	2005-107
South Dauphin Island East Unit (East Amos)	100% of actual production	93-206

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
South Dauphin Island West Unit (West Amos)	100% actual production	93-202
South Fairview (Carter)	Average of sum of each tract's proportionate share of net oil pore volume expressed in acre-feet and usable wellbore credit.	90-47
Southeast Bluff Upper Carter (Upper Carter Sand)	50% net oil pore volume in acre-feet and 50% usable wellbore credit.	2005-113
Southeast Citronelle Unit	Best 6 months production from Jan. 1963 through Oct. 1963, 1/3 microlog acre-feet, and 1/3 oil-in-place equivalent acre-feet.	64-4
Southeast Frisco City (Haynesville Formation)	50% productive acre-feet of net oil pay and 50% capable producible wells in the Unit.	98-59
Southwest Canaan Church (Smackover)	50% usable wellbore credit and 50% bulk volume as computed in acre-feet from the net pay map.	2001-142
Stave Creek (Smackover)	Remaining recoverable reserves.	85-59 and 85-60
Turkey Creek (Smackover)	Total cumulative oil produced through July 31, 1974.	74-51
Wallers Creek (Smackover)	20% well count, 50% remaining productive acre-feet and 30% original net porosity acre-feet.	91-324

ALLOCATION FORMULAE FOR UNITIZED FIELDS

Note: This chart does not include fieldwide units for coalbed methane wells.		
Unit and Formation	**Formula**	**Order No.**
Wayside (Carter)	50% net oil pore volume (based on cutoffs of 9% porosity and 40% water saturation), 40% usable wellbores and 10% remaining recoverable primary reserves.	88-91
West Canaan Church (Smackover "A" & "B" Pools)	50% usable wellbore credit and 50% bulk volume as computed in acre-feet from the net pay map.	2002-30
West Falco (Haynesville)	Each tract's total production acre-feet divided by the total net productive acre-feet in the underlying unit, multiplied by 100.	2011-95
West Foshee (Pilot)	Each tract's proportionate share of productive acre-feet underlying the Unit Area.	89-26 and 89-72
Womack Field (Smackover)	50% number of producing wells and 50% hydrocarbon pore volume.	74-61