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Oil and Gas Spacing and Forced Pooling Requirements: How States Balance Energy Development and Landowner Rights

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OIL AND GAS SPACING AND FORCED POOLING REQUIREMENTS: HOW STATES BALANCE ENERGY DEVELOPMENT AND LANDOWNER RIGHTS

Frank Sylvester and Robert W. Malmshheimer¹

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I. INTRODUCTION

States' oil and gas laws, including those regulating hydraulic fracturing, attempt to balance states' goals of resource development with landowners' rights.² Well spacing and pooling laws are two of the mechanisms used to accomplish this.

Spacing laws require oil and gas wells to (1) be minimum linear distances from property lines and nearby wells; (2) conform to density requirements that specify a minimum drilling unit size; or (3) both. Pooling laws are a function of spacing regulations because single landowners may be unable to drill for oil and gas if their tract is not large enough to comply with spacing size requirements.³ Pooling laws allow owners of adjacent

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² See generally A.W. Walker, Jr., *Property Rights in Oil and Gas and Their Effect upon Police Regulation of Production*, 16 TEX. L. REV. 370 (1938).

³ See, e.g., Rowland Harrison, *Regulation of Well Spacing in Oil and Gas Production*, 8 ALTA. L. REV. 357, 361-62 (1970) (discussing Texas' spacing regulations in pooling).

tracts to voluntarily or involuntarily combine tracts of land to form spacing units that meet states' spacing unit acreage requirements.⁴

Involuntary pooling laws, generally referred to as "forced pooling laws," address the scenario when a single landowner, or more commonly a group of landowners, wish to pool their tracts together for oil or gas development,⁵ but one or more nearby landowners (whose land would be necessary to create a spacing unit) hold out against drilling operations.⁶ States adopt forced pooling laws to balance (1) the protection of neighboring landowners' correlative rights; (2) states' interests in preventing waste and promoting economic activity; and (3) non-consenting landowners' rights.⁷

This Article documents the variation in states' approaches to this balancing. After describing the historical context for well spacing and forced pooling laws, this Article discusses the forced pooling process. The results and analysis of a census of states' minimum spacing unit size and well setback requirements, minimum acreage control requirements, and treatment of non-consenting landowners form the remainder of the article. The conclusion summarizes how state oil and gas laws incentivize landowners and well operators to voluntarily enter oil and gas agreements, and provides some evidence that some states have recently amended their laws to accomplish this goal.

Subsurface rights may or may not be owned by the surface rights owner.⁸ However, to simplify nomenclature and analysis, this Article assumes the surface and subsurface rights have not been severed, and assumes landowners own both the surface and mineral rights. In locations where split estates exist, the Article's reference to landowners refers to the owner of the subsurface rights.

⁴ See, e.g., Larry S. Eubanks & Michael J. Mueller, *An Economic Analysis of Oklahoma's Oil and Gas Forced Pooling Law*, 26 NAT. RESOURCES J. 469, 470–71 (1986).

⁵ Lindsey Trachtenberg, *Reconsidering the Use of Forced Pooling for Shale Gas Development*, 19 BUFF. ENVTL. L.J. 179, 182 (2012).

⁶ See Bruce M. Kramer, *Compulsory Pooling and Unitization: State Options in Dealing with Uncooperative Owners*, 7 J. ENERGY L. & POL'Y 255, 258–60 (1986).

⁷ Harrison, *supra* note 3, at 367.

⁸ See Jared C. Bennett, *Ownership of Transmigratory Minerals, Utah and Zebras: Proof that Oil and Gas Ownership Law Needs Reform*, 21 J. LAND RESOURCES & ENVTL. L. 349, 350–52 (2001) (discussing the history and differences between ownership-in-place and non-ownership theories of mineral interests among states and the policy problems thereof). For background and discussion on the separation of subsurface and mineral estates and surface estates, see Richard J. Garcia & Paula K. Manis, *Across the Great Divide: Surface Owners v. Severed Mineral Owners – What is Reasonable Use?*, 78 MICH. B.J. 140, 140 (1999), Patrick H. Martin, *Unbundling the Executive Right: A Guide to Interpretation of the Power to Lease and Develop Oil and Gas Interests*, 37 NAT. RESOURCES J. 311, 325–39 (1997), and Andrew M. Miller, *A Journey Through Mineral Estate Dominance, the Accommodation Doctrine, and Beyond: Why Texas is Ready to Take the Next Step with a Surface Damage Act*, 40 HOUS. L. REV. 461, 465–71 (2003) (providing a background on the duties of surface and mineral estate owners, standards of liability, and the nature of mineral ownership in accordance with oil and gas law in Texas).

II. THE HISTORY OF FORCED POOLING LAWS

A boom in oil production resulted in extremely low oil prices during the 1920s.⁹ The common law Rule of Capture, which governed most states' oil and gas *in situ* resources before the 1930s and 1940s, contributed to these low prices.¹⁰ The Rule of Capture was based on the concept of "first in time, first in right," and meant that if a reservoir of oil or gas lay under both A's property and B's property, A could legally extract *all* the oil from the reservoir and receive all the benefits.¹¹ Therefore, to preserve her right to the oil that lay partially under her property, B would need to erect a well and extract the reservoir's content before or concurrently with A.¹² The Rule of Capture led many landowners whose property overlaid oil or gas reservoirs to build multiple wells on their land so they could extract their resources as quickly as possible.¹³

Too many wells were inefficient and unnecessary. The cost of drilling excessive wells was estimated to be millions of dollars a year.¹⁴ Production waste and inefficiency, caused by the reduction in geologic pressure, made it more difficult and costly to extract the oil and gas.¹⁵ Overproduction caused oil and gas market prices to decline.¹⁶ By the 1930s and 1940s, states enacted spacing and pooling laws to address these issues and protect their interests in market control, waste prevention, and resource development.¹⁷

Texas promulgated the first linear setback requirements in the United States.¹⁸ These regulations, known as Rule 37, required a minimum of 300 feet between wells and 150 feet between wells and property lines.¹⁹

⁹ See Harrison, *supra* note 3, at 359–60; see also H.H. Kaveler, *The Engineering Basis for and the Results from the Unit Operation of Oil Pools*, 23 TUL. L. REV. 331, 335–36 (1949).

¹⁰ Harrison, *supra* note 3, at 359–60; A. Allen King, *Pooling and Unitization of Oil and Gas Leases*, 46 MICH. L. REV. 311, 311 (1948).

¹¹ Bruce M. Kramer & Owen L. Anderson, *The Rule of Capture – An Oil and Gas Perspective*, 35 ENVTL. L. 899, 906 (2005).

¹² JOHN S. LOWE, OIL AND GAS LAW IN A NUTSHELL 9–11 (5th ed. 2003); Joseph A. Dammel, Note, *Notes from Underground: Hydraulic Fracturing in the Marcellus Shale*, 12 MINN. J. L. SCI. & TECH. 773, 782–86 (2011); see also King, *supra* note 10, at 311; Kramer, *supra* note 6, at 256–57.

¹³ See *W. Land Servs., Inc. v. Dep't of Envtl. Conservation*, 26 A.D.3d 15, 16–17 (N.Y. App. Div.2005).

¹⁴ Harrison, *supra* note 3, at 360.

¹⁵ *Id.*; Kaveler, *supra* note 9, at 335.

¹⁶ *W. Land Servs.*, 26 A.D.3d at 17; Harrison, *supra* note 3, at 359–60; see also Kaveler, *supra* note 9, at 335–36.

¹⁷ See Harrison, *supra* note 3, at 361–65 (showing that Texas and Oklahoma enacted spacing requirements in the 1920s and early 1930s). *But see* Russell D. Culbertson, *Bennion v. Utah State Board of Oil, Gas & Mining: Interpreting the Pooling Provisions of Utah's Oil and Gas Conservation Act*, 6 J. ENERGY L. & POL'Y 219, 219–21 (1985) (stating that Utah, for example, did not adopt an oil and gas conservation act until 1955). See generally Owen L. Anderson & Ernest E. Smith, *Exploratory Unitization Under the 2004 Model Oil and Gas Conservation Act: Leveling the Playing Field*, 24 J. LAND RESOURCES & ENVTL. L. 277, 278–80 (2004).

¹⁸ Harrison, *supra* note 3, at 361, 363–65; Raymond M. Myers, *Spacing Pooling and Field-Wide Unitization*, 18 MISS. L.J. 267, 267–68 (1947).

¹⁹ Harrison, *supra* note 3, at 361, 363–65.

States also created density requirements that limited a single well to a given area by requiring drilling units to contain minimum acreage.²⁰ This required landowners not owning the minimum acreage to pool (or integrate) their land with their neighbors' lands to form drilling units so they could exercise their mineral rights.²¹ In turn, states enacted voluntary and forced pooling laws to regulate this process.²²

Voluntary pooling (also known as voluntary integration) is based on contractual agreements between landowners and oil and gas drillers and well operators.²³ Landowners whose lands collectively cover oil or gas deposits agree to build one well and share in the production profits based on the percentage of the pool that lies under their parcels.²⁴ A typical lease between a landowner and a well operator will include a provision that allows the operator to pool landowners' leased interests with other leases to form a drilling unit.²⁵ State regulation of voluntary pooling agreements is minimal.²⁶

States with voluntary pooling laws also have statutes and regulations that allow owners and operators to use *forced* pooling to achieve a similar result.²⁷ These laws require "fair, reasonable, and equitable" or "reasonable" terms in the sharing of oil and gas production.²⁸ Forced pooling laws (also known as involuntary pooling or compulsory integration)²⁹ attempt to resolve the problem of non-consenting owners: landowners with oil or gas rights who refuse to voluntarily pool their

²⁰ *Id.* at 366.

²¹ *Id.*

²² *See id.* at 366–67 (explaining the origins of pooling laws).

²³ James R. Neal, *Compulsory Pooling Promotes Conservation of Michigan's Oil and Gas Natural Resources*, 78 MICH. B.J. 158, 160–61 (1999).

²⁴ *Id.* at 161.

²⁵ *Id.*

²⁶ State regulations only briefly mention the ability for owners to pool their tracts voluntarily before establishing compulsory pooling in greater detail. *See, e.g.*, IDAHO CODE ANN. § 47-322(a) (West 2006) ("When two (2) or more separately owned tracts are embraced within a spacing unit, or when there are separately owned interests in all or a part of a spacing unit, the interested persons may integrate their tracts or interests for the development and operation of the spacing unit. In the absence of voluntary integration, the commission, upon the application of any interested person, shall make an order integrating all tracts or interests in the spacing unit for the development and operation thereof and for the sharing of production therefrom. The commission, as a part of the order establishing a spacing unit or units, may prescribe the terms and conditions upon which the royalty interests in the unit or units shall, in the absence of voluntary agreement, be deemed to be integrated without the necessity of a subsequent separate order integrating the royalty interests. Each such integration order shall be upon terms and conditions that are just and reasonable.") (emphasis added).

²⁷ For a succinct mention of the history and significance of forced pooling, see Linda R. Correll, *Oil and Gas: Unit v. Borehole Pooling: Where Do We Stand after Amoco Production Co. and Its Progeny?*, 42 OKLA. L. REV. 663, 665–70 (1989).

²⁸ Virtually all states contain this language. *See, e.g.*, IDAHO CODE ANN. § 47-322(a) ("Each such integration order shall be upon terms and conditions that are just and reasonable.").

²⁹ Forced pooling and compulsory integration are essentially two names for the same type of law. Compulsory unitization, or forced unitization, is substantially similar, but governs unitizing an entire pool or gas deposit for uniform operation and is not limited in scope to individual spacing units. Unitization is used more often with liquid petroleum deposits, rather than shale gas or other "tight" deposits that do not flow freely underground as a fugacious resource.

ownership rights with other landowners (referred to as participating landowners).³⁰ If a certain statutory - or regulatory - defined percentage of landowners³¹ want to exercise their oil or gas rights and there are non-consenting landowners, the owners who want to develop their mineral rights or well operator, can initiate an administrative procedure to forcefully pool non-consenting landowners' oil and gas development rights with participating landowners.³² Forced pooling laws are an imperfect, yet practical, way to balance efficient resource production and landowner rights.³³

III. THE FORCED POOLING PROCESS

Well operators considering drilling for oil or gas test the geology of the selected area, map out possible drilling locations, and choose an optimal site, before trying to voluntarily obtain leases from landowners. Choosing which landowners to enter leases with depends on geologic conditions, the state's spacing and drilling unit regulations, and/or the location of wells already in place nearby.

There are several major elements of forced pooling statutes.³⁴ First, statutes and regulations require those attempting to commence a forced pooling action to comply with basic preconditions, such as mineral interests belonging to multiple landowners.³⁵ Second, application procedures typically require a hearing with a state agency, usually the state Oil and Gas Board or state Conservation Commission, and identify who can apply for a forced pooling action and who has standing at the hearing. Standing is usually granted to (1) any interested party, (2) the well operator, (3) landowners within the proposed drilling unit, and (4) anyone that may be affected by a proposed drilling or spacing unit.³⁶ Third, statutes establish.

³⁰ See, e.g., ALA. CODE § 9-17-13(c)(5) (2001) (defining a non-consenting owner as "an owner who owns a tract or interest in a drilling or production unit and who has not, on or before the date a pooling or integration order is entered with respect to such unit, reached an agreement with the operator relative to the terms and conditions which will govern the manner in which his or her said tract or interest shall be developed and operated.").

³¹ See *infra* Part D.2 for more discussion of state regulatory drilling unit acreage percentage minimums, herein referred to as minimum acreage requirements.

³² Neal, *supra* note 23, at 161.

³³ See Harrison, *supra* note 3, at 367.

³⁴ See Sharon O. Flanery & Ryan J. Morgan, *Overview of Pooling and Unitization Affecting Appalachian Shale Development*, 32 ENERGY & MIN. L. INST. 459, 477 (2011). For an overview of the steps in a forced pooling action in Oklahoma, see Correll, *supra* note 27, at 665-670.

³⁵ Trachtenberg, *supra* note 5, at 198-202; see also Correll, *supra* note 27, at 665-670.

³⁶ One way some states protect landowners' correlative rights is to limit who has standing to request a forced pooling order or be heard at a forced pooling hearing. While some states allow any interested party to initiate or participate in a forced pooling hearing, other states limit these actions to owners of mineral interests in the proposed drilling unit. Twenty-one states (AL, AK, CA, CO, FL, ID, IL, IA, KS, KY, LA, MI, MT, NE, NV, NY, OR, SC, SD, WA, and WY) allow any interested party to request a hearing (See N.Y. Env'tl. Conserv. Law § 23-0901 (McKinney 2007)); however, these states generally do not define "any interested person (party)". For example, California allows any person who may be affected by a spacing unit plan to request a hearing. See CAL. CODE REGS. § 1721.2 (Deering, LEXIS through Register 2014). Arkansas requires the applicant for a hearing to be either someone authorized to

procedures to provide notice of the forced pooling application to all interested parties, including non-consenting owners.³⁷ The notice typically (1) specifies the other interested parties; (2) alerts the recipients of the time, place, and nature of forced pooling application hearing; and (3) describes the lands affected by the application.³⁸

At the hearing, the governing body approves or denies the forced pooling application based on whether forced pooling (1) is necessary; (2) will increase the oil or gas recovered; and (3) will raise the value of the oil or gas recovered above any additional costs associated with the application and operations.³⁹ When determining the necessity of the pooled unit, governing bodies will look to the overarching goals of states' oil and gas statutes, such as preventing waste, increasing recovery of oil or gas, avoiding unnecessary drilling, supporting drilling at optimal geographic and geologic locations, and protecting landowners' correlative rights.⁴⁰ Most states also require that before or after a forced pooling order is approved, either (1) landowners with a minimum percentage of acreage in the proposed drilling unit ratify it; or (2) the drilling operator acquires a voluntary pooling agreement with landowners representing a minimum percentage of the proposed drilling unit.⁴¹

The result of forced pooling orders is that non-consenting owners are treated according to states' forced pooling statutes. These statutes may (1) allow non-consenting owners to participate in well profits without being subject to the risks of drilling an unprofitable well, (2) be silent as to non-

do so in voluntary leases. See Ark. Oil & Gas Commission, Gen. Rules and Regs., Rule A-3 Eight states (NM, OK, PA, TX, UT, VT, VA, and WV) grant standing to operators and owners of mineral rights in proposed drilling units. See N.M. STAT. ANN. § 70-2-17 (2003). States that require an applicant to have an interest in the drilling unit may exclude parties whose land may be adjacent to or indirectly affected by pooling and drilling from forced pooling proceedings. This can create difficulties for landowners whose property borders a proposed drilling unit, but states' spacing regulations and the presence of nearby wells preclude those landowners from being included in a drilling unit. In this situation, the only way landowners can exercise their mineral rights is to be included in the proposed drilling unit that abuts their property. See Lisa Vaughn, *New Facets of Old Alternatives for Unleased Mineral Interests*, TEX. WESLEYAN L. REV. 113, 119 (2009). States try to protect the correlative rights of this type of landowner by either allowing any interested person to request a hearing, or clearly describing this scenario and the ability of the excluded landowner to apply to alter the spacing unit for his inclusion. Ohio's statute is an example of this protection:

If a tract of land is of insufficient size or shape to meet the requirements for drilling a well . . . whichever is applicable, and the owner of the tract who also is the owner of the mineral interest has been unable to form a drilling unit . . . on a just and equitable basis, such an owner may make application to the division of oil and gas resources management for a mandatory pooling order.

OHIO REV. CODE ANN. § 1509.27 (LexisNexis 2013).

³⁷ Flanery & Morgan, *supra* note 34, at 477.

³⁸ *Landowner Option Guide*, N.Y. DEP'T OF ENVTL. CONSERV., <http://www.dec.ny.gov/energy/1590.html> (last visited on Feb. 25, 2015); accord N.Y. ENVTL. CONSERV. LAW §§ 23-0901(2)-(3), (6) (McKinney 2007).

³⁹ §§ 23-0901(2), (5). For examples of other factors, see Correll, *supra* note 27, at 668-69 and Trachtenberg, *supra* note 5, at 198-99.

⁴⁰ See ALA. CODE §§ 9-17-81, 82 (2001); see also N.Y. ENVTL. CONSERV. LAW § 23-0301.

⁴¹ Flanery & Morgan, *supra* note 34, at 478.

consenting landowners' treatment, (3) impose a risk penalty on non-consenting landowners, or (4) provide non-consenting landowners with several options.⁴²

New York State law provides an example of how forced pooling works.⁴³ Assume a drilling operator wants to lease land equal to or greater than New York's default spacing unit size of 640 acres⁴⁴—which New York requires to be in a square or rectangular shape. If the well operator voluntarily obtains leases from landowners controlling 70% of the drilling unit's acreage, but landowners controlling the remaining 30% of the acreage do not enter leases, the well operation can not begin. The well operator must then either reconfigure the drilling unit's boundaries (and lease all the land within the reconfigured drilling unit), or initiate a forced pooling proceeding. In both situations, the non-consenting landowners are interfering with the correlative rights of the landowners who voluntarily entered leases. However, because New York's pooling law requires a minimum of 60% of the drilling unit's acreage be leased to the well operator (assuming all of the law's other conditions have been met), a New York State Department of Environmental Conservation Hearing Officer could approve forced pooling at a forced pooling hearing, so that drilling could take place.⁴⁵

IV. ANALYSIS OF EXISTING STATE LAWS

While forced pooling laws, and spacing requirements before them, have been in effect in most states since the 1930s to 1940s,⁴⁶ the recent escalation of high-volume hydraulic fracturing operations for shale oil and gas extraction has reemphasized these laws' importance. Differences in geologic formations and states' statutory and regulatory frameworks have created a heterogeneous collection of spacing and forced pooling requirements that differ based on minimum spacing unit size and well setback requirements, minimum acreage control requirements, and treatment of non-consenting landowners.⁴⁷

⁴² See discussion *infra* Part D.3.d.

⁴³ *Landowner Option Guide*, *supra* note 38.

⁴⁴ See, e.g., N.Y. ENVTL. CONSERV. LAW § 23-0501-1(b)(1)(vi) (McKinney Supp. 2015); §§ 23-0701, 0901 (McKinney 2007).

⁴⁵ Marie C. Baca, *Forced Pooling: When Landowners Can't Say No to Drilling*, PROPUBLICA (May 18, 2011, 11:01 PM), <http://www.propublica.org/article/forced-pooling-when-landowners-cant-say-no-to-drilling>.

⁴⁶ See, e.g., *Patterson v. Stanolind Oil & Gas Co.*, 77 P.2d 83, 95 (Okla. 1938) (upholding the constitutionality of forced pooling laws in Oklahoma), *appeal dismissed*, 305 U.S. 376 (1939).

⁴⁷ Kramer, *supra* note 6, at 256–61; see also Matt Willie, Comment, *Hydraulic Fracturing and "Spotty" Regulation: Why the Federal Government Should Let States Control Unconventional Onshore Drilling*, 2011 BYU L. REV. 1743, 1746 (2011) (arguing for state-to-state regulation of hydraulic fracturing operations by way of environmental laws, forced pooling statutes, regional differences, and the potential costs of federal regulation). Other differences, beyond the scope of this article, also differentiate states' spacing and forced pooling requirements. For example, Pennsylvania's forced

As of January 6, 2013, eleven states (Connecticut, Delaware, Hawaii, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Rhode Island, and Wisconsin) did not have major oil and gas legislation.⁴⁸ The remainder of this article analyzes the variability of the other thirty-nine states' oil and gas laws.

A. Well Spacing Requirements

The waste and inefficiency that resulted from the Rule of Capture caused states to adopt well spacing requirements.⁴⁹ Setback requirements mandate minimum distances between a well and other wells, property lines, or both.⁵⁰ There is considerable variability in states' setback requirements, with some states differentiating setbacks based on whether the well is extracting oil or gas.⁵¹

Minimum spacing unit sizes ideally are based on the maximum acres that can be efficiently and economically drained by a single well in a specified oil or gas formation.⁵² Generally, large drilling unit sizes have greater setback distances between the well and property boundaries.

Most state drilling units are based on standard public land survey sizes, with a section being one square mile or 640 acres, and half, quarter, and quarter-quarter sections containing 320 acres, 160 acres, and 40 acres, respectively.⁵³ Typically, the smallest regulation spacing unit is a quarter-quarter section,⁵⁴ although California regulations include a default drilling unit of just one acre.⁵⁵

pooling law does not apply to oil and gas formations above the Onondaga Horizon or formations above 3,800 feet below the surface, such as parts of the Marcellus Shale. *See* 58 P.S. § 403. (West 1996). Because of this, Pennsylvania's forced pooling law has been seldom used. A rare, recent application for integration of un-leased tracts for development in the Utica Shale, which is located below the Onondaga Horizon, was withdrawn as of August 31, 2014. *See* Mike Lee, *Pa. Driller Drops Forced Pooling Request*, E&E PUBLISHING (Sept. 2, 2014), <http://www.eenews.net/greenwire/2014/09/02/stories/1060005093>.

⁴⁸ These states have either no, or very limited, oil and gas legislation. If there is oil and gas legislation it typically sets out procedures for limited oil and gas exploration permits. For example, Wisconsin Department of Natural Resources has authority over oil and gas production; pursuant to statutory authority, the Department of Natural Resources promulgated regulations the purpose of which "is to establish a licensing procedure and minimum standards for oil and gas exploration in this state for the specific protection of waters of the state, both surface and ground . . ." WIS. ADMIN. CODE NR § 134.01 (West 2014).

⁴⁹ Neal, *supra* note 23, at 159.

⁵⁰ *Id.*

⁵¹ *See infra* Table 1.

⁵² Ind. Reg. Natural Res. Comm'n Information Bulletin #58, *Oil and Gas Drilling Unit and Well Spacing Requirements for Horizontal Wells* (June 11, 2008), <http://www.in.gov/legislative/iac//20080611-IR-312080427NRA.xml.html>; Myers, *supra* note 18, at 267.

⁵³ *See infra* Table 1.

⁵⁴ *See, e.g.*, ALA. ADMIN. CODE r. 400-1-2.02(2) (2014); FLA. ADMIN. CODE ANN. r. 62C-26.004 (2010); GA. COMP. R. & REGS. 391-3-13.05 (1982); IDAHO ADMIN. CODE r. 20.07.02.330.01-02 (1992); IOWA ADMIN. CODE r. 565-51.16(1) (2008); MICH. ADMIN. CODE r. 324.301 (1996); 26-2:1.7 MISS. CODE R. § 3(a) (LexisNexis 2011).

⁵⁵ CAL. PUB. RES. CODE § 3602 (West 2001).

Table 1. Minimum spacing unit size and setback requirements for oil and gas wells in effect on January 6, 2013, by state. These statutes may be supplemented or superseded by laws for specific (1) oil or gas fields, (2) counties, or (3) regions in a state. Except where noted by well depth, the minimum spacing unit sizes and setbacks apply to the shallowest well depth regulated by the state. An endash (“–”) indicates this size or distance is not enumerated in a state’s statutes or regulations.

State ⁵⁶	Oil Wells			Gas Wells		
	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)
AL	40	330	–	40	330	–
AK	160	500	1000	640	1500	3000
AZ	80	330	–	640	1660	–
AR	640	560	560	640	560	560
CA	1	100	–	1	100	–
CO ^a	(<2,500 ft deep)	200	300	(>2,500 ft deep)	600	1200 ft

⁵⁶ ALA. ADMIN. CODE r. 400-1-2-.02(1)–(2) (2014); ALASKA ADMIN. CODE tit. 20, § 25.055 (2015); ARIZ. ADMIN. CODE § 12-7-107 (2013); 178-00-1 ARK. CODE R. § B-43 (LexisNexis2014); CAL. PUB. RES. CODE § 3600 (West 2001); 2 COLO. CODE REGS. § 404-3 (2009); FLA. ADMIN. CODE ANN. r. 62C-26.004 (2010); GA. COMP. R. & REGS. 391-3-13.05 (1982); IDAHO ADMIN. CODE r. 20.07.02.330.01–02 (1992); 225 ILL. COMP. STAT. 725/21.1 (West 2007); 312 IND. ADMIN. CODE 16-5-1 (2015); IOWA ADMIN. CODE r. 565-51.15 (2008); KAN. ADMIN. REGS. § 82-3-207 (2006); KY. REV. STAT. ANN. § 353.610 (West 2011); LA. ADMIN. CODE tit. 43, § 1905(A)(1)–(3) (2011); MICH. ADMIN. CODE r. 324.301 (1996); 26-2:1.7–8 MISS. CODE R. § 3(a) (LexisNexis 2011); MO. CODE REGS. ANN. tit. 10, § 50-2.070 (2007); MONT. ADMIN. R. 36.22.702 (1982); 267 NEB. ADMIN. CODE § 03-013.02 (2014); NEV. ADMIN. CODE § 522.235 (2000); N.M. CODE R. §§ 19.15.15.9–10 (2008); N.Y. ENVTL. CONSERV. LAW § 23-0501(1)(b) (McKinney Supp. 2015); N.D. ADMIN. CODE 43-02-03-18(1) (2012); OHIO ADMIN. CODE 1501:9-1-04 (2011); OKLA. ADMIN. CODE §§ 165:10-1-21, 22, 24 (2011); OR. ADMIN. R. 632-010-0230 (2013); 58 PA. STAT. ANN. §§ 407(6), 507(a) (West 1996 & Supp. 2014); S.C. CODE ANN. REGS. 121-8.9 (2014); S.D. ADMIN. R. 74:10:03:08–09 (2012); TENN. OIL & GAS BOARD, WELL SPACING: RULE 1040-2-4.01 (2012); 16 TEX. ADMIN. CODE § 3.37 (2009); UTAH ADMIN. CODE r. 649-3-2 (2015); VA. CODE ANN. § 45.1-36.17 (West 2014); WASH. REV. CODE ANN. § 78.52.210 (West 2005); WASH. ADMIN. CODE § 344-12-045 (2003); W. VA. CODE ANN. § 22C-9-7 (West 2006); W. VA. CODE R. § 39-1-4.2 (2014); 055-003 WYO. CODE R. § 2 (LexisNexis 2014).

State	Oil Wells			Gas Wells		
	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)
FL	40	460	—	640	1320	—
GA	40	330	660	160	660	1867 ft
ID	40	—	920	640	—	1840
IL	10	330	660	10	330	660
IN	20	330	660	20	330	1320
IA	40	330	660	640	1320	3750 ft
KS	10	330	—	10	330	—
KY ^b	—	330	660	—	500	1000
LA	(>3,000 ft deep)	330	900	(Any gas well)	330	2000 ft
MI	40	330	—	40	330	—
MS	40	330	660	320	990	1980 ft
MO	40	500	1000	640	2220	4500 ft
MT ^a	40	330	—	40	330	—
NE	40 (<2,500 ft)	300		40	300	
NV	(<5,000 ft) 40	330	—	160	660	—
NM ^c	40	330	—	160	660	—
NY	40	460	—	(<4,000 ft) 80	460	—
ND	40	500	—	160	500	—
OH ^a	(<1,000 ft) 1	100	200	(>4,000 ft) 40	500	1000
OK	(<2,500 ft) 10	165	300	(>2,500 ft) 40	330	600
OR ^d	—	—	—	160	250	500
PA	—	330	—	—	330	1000
SC	—	330	900	—	330	2000
SD	40	500	1000	640	500	3750

State	Oil Wells			Gas Wells		
	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)	Minimum Spacing Unit Size (number of acres)	Minimum Distance from Property Boundary (feet)	Minimum Distance from Nearest Well (feet)
TN ^a	(<1,000 ft) 10	330	660	(2,000- 5,000 ft) 40	330	660
TX	40	467	1200	40	467	1200
UT	40	200	920	40	200	920
VA	–	625	1250	–	1250	2500
WA	160	500	1000	640	1000	2000
WV ^c	160	400	3000	640	400	3000
WY	40	–	920	40	–	920

^a Colorado, Montana, Ohio, and Tennessee do not distinguish by mineral type (i.e., oil or gas). Notes: (1) Colorado's distance from property boundary and distance from nearest well vary based on whether the well is less than 2,500 feet in depth or greater, and (2) Montana's minimum spacing unit sizes are based on well depth; this table lists the minimum spacing unit size for the shallowest depth.

^b Kentucky's minimum spacing unit sizes, distance from property boundary, and distance from nearest well are based on well depth. This table lists the regulations for the shallowest depth.

^c New Mexico's gas well minimum spacing unit size regulations are based on the county where the well is located. More populous counties require greater minimum spacing unit sizes. This table lists the default minimum spacing unit size and distances from the property line for wells that are located in counties not specifically identified by the statute (N.M. Code § R. 19.15.15.10).

^d Oregon only has minimum spacing unit sizes for gas wells. It does not have minimum spacing unit sizes for oil wells.

^e West Virginia's gas well requirements vary based on well type. This table lists the requirements for deep gas wells; other requirements govern shallow gas wells and coal bed methane.

Larger drilling units or greater linear spacing requirements necessitate more voluntary, and forced, pooling because it is less likely single landowners' tracts will be large enough to meet large spacing and density requirements.⁵⁷ Hence, neighboring landowners need to pool their

⁵⁷ Harrison, *supra* note 3, at 361–62.

interests together to form spacing units.

Rowland Harrison, in his study of the regulation of well-spacing regulation, found that over time, states increased their well spacing requirements.⁵⁸ Presumably, such increases are the result of a greater understanding of oil and gas formations' physical properties, and improvements in engineering and technology that increase oil and gas deposit extraction and production with fewer wells.⁵⁹

Several states differentiate spacing requirements depending on whether the hydrocarbon source is oil or gas, with spacing requirements for gas wells typically larger and greater than those for oil wells. For example, Alaska provides that an oil well drilling unit must be at least one government quarter section (160 acres), while a gas well must be a full section (640 acres).⁶⁰ Presumably, this reflects differences in the resources' physical properties such as the potential for gas to travel greater distances, and/or differences in the geology and size of oil and gas reservoirs. Some states have multiple minimum spacing unit sizes based on the wells' depth. For example, Colorado's well spacing unit requirement differs for wells drilled less than 2,500 feet and those drilled greater than 2,500 feet.⁶¹ Florida differentiates oil wells' minimum spacing unit and property line setbacks based on whether wells are less than, or greater than, 7,000 feet deep.⁶²

B. Minimum Acreage Control Requirements

Forced pooling statutes contain minimum acreage control requirements. These vary from state to state, and specify the required percentage of interests in a drilling unit a well operator must control before a forced pooling application can be approved by a state's oil and gas agency or other commission.⁶³ In essence, this represents the minimum percentage of acreage needed in a drilling unit to ratify a forced pooling order before it is operative. States characterize these minimum acreage control requirements differently, using terms such as: (1) a minimum "working interest" group⁶⁴ (2) owners of at least a specified percentage of interests,⁶⁵ (3) those required to pay at least a specified percentage of expenses and

⁵⁸ *Id.* at 362–63.

⁵⁹ *Id.*

⁶⁰ ALASKA ADMIN. CODE tit. 20, § 25.055 (2015).

⁶¹ 2 COLO. CODE REGS. § 404-3 (2009).

⁶² FLA. ADMIN. CODE ANN. r. 62C-26.004 (2010).

⁶³ Flanery & Morgan, *supra* note 34, at 476, 483.

⁶⁴ CAL. PUB. RES. CODE § 3643 (West 2001) (“[A]greement was consented to by persons owning at least three-fourths of the *working interests* and three-fourths of the lessors' royalty interests”) (emphasis added).

⁶⁵ ARIZ. REV. STAT. ANN. § 27-533(A) (2000) (“[P]lan of unitization has not been so signed, ratified or approved by lessees and royalty owners owning the required percentage interest in and to the unit area”).

owning a specified percentage of production,⁶⁶ or (4) owners of a percentage of the production or proceeds thereof.⁶⁷

Of the thirty-nine states with significant oil and gas laws, nine states⁶⁸ do not specify minimum acreage control requirements in their statutes or regulations. For example, Pennsylvania's minimum acreage control clause states, "the commission, upon the application of any operator having an interest in the spacing unit, shall make an order integrating all tracts or interests in the spacing unit for the development and operation thereof and for the sharing of production therefrom."⁶⁹ The minimum acreage control requirement percentages for the other thirty states range from 50% to 80% of the participating landowners' costs.⁷⁰ For participating owners, drilling and operation costs are distributed on a proportionate basis, with responsibility for costs based upon the percentage of surface acreage that each owner's land contributes to the drilling unit. For example, if one participating owner's land makes up 55% of the drilling unit, she is responsible for 55% of the costs.

[Table 2 on next page]

⁶⁶ N.Y. ENVTL. CONSERV. LAW § 23-0901-6 (McKinney 2007) ("[A]pproved in writing by the owners of sixty percent or more in interest as the costs of such unit operations are shared under the order of the department, and by owners of record of a like percentage of a one-eighth royalty interest in . . . the unit . . .") (emphasis added).

⁶⁷ COLO. REV. STAT. ANN. § 34-60-118(5) (West 2006) ("[W]ho . . . will be required to pay at least eighty percent of the costs of the unit operation, and also by the owners of at least eighty percent of the production or proceeds thereof . . .").

⁶⁸ Alaska, Idaho, Indiana, Iowa, Louisiana, North Carolina, Pennsylvania, Texas, and Virginia.

⁶⁹ 58 PA. STAT. ANN. § 408(a) (West 1996).

⁷⁰ See *infra* Table 2.

Table 2. Minimum acreage control percentages required to ratify a forced pooling order by state.

State	Minimum Acreage Control Percentage
Tennessee ⁷¹	50%
Illinois, Kentucky ⁷²	51%
New York, North Dakota, South Dakota, Vermont ⁷³	60%
Nevada ⁷⁴	62.5%
Arizona, Kansas, Oklahoma ⁷⁵	63%
Ohio ⁷⁶	65%
Alabama ⁷⁷	66.67%
Montana, Utah ⁷⁸	70%
Arkansas, California, Florida, Georgia, Michigan, Mississippi, Missouri, Nebraska, New Mexico, Oregon, South Carolina, Washington, West Virginia ⁷⁹	75%
Colorado, Wyoming ⁸⁰	80%

Montana, New Mexico, and North Dakota do not allow just one owner to commence a forced pooling action.⁸¹ In these states, if one landowner controls 80% of the interests in a drilling unit, she cannot by herself move for forced pooling of the remaining 20%. New Mexico law also requires at least two non-consenting owners to *block* forced pooling.⁸² Thus, in New Mexico, forced pooling actions require (1) two or more

⁷¹ TENN. CODE ANN. § 60-1-202(a)(4)(N) (West 2014).

⁷² 225 ILL. COMP. STAT. ANN. 725/23.8 (West 2007); KY. REV. STAT. ANN. § 353.630(2) (West 2011).

⁷³ N.Y. ENVTL. CONSERV. LAW § 23-0901-6 (McKinney 2007); N.D. CENT. CODE ANN. § 38-08-09.9 (West 2008); S.D. CODIFIED LAWS § 45-9-40 (2004); VT. STAT. ANN. tit. 29, § 525(d)(1) (West 2007).

⁷⁴ NEV. REV. STAT. ANN. § 522.083.1(a) (West 2000).

⁷⁵ ARIZ. REV. STAT. ANN. § 27-533(A) (2000); KAN. STAT. ANN. § 55-1305(l) (2005); OKLA. STAT. ANN. tit. 52, § 87.9(G) (West Supp. 2014).

⁷⁶ OHIO REV. CODE ANN. § 1509.28(B) (West 2013).

⁷⁷ ALA. CODE § 9-17-84 (2001).

⁷⁸ MONT. CODE ANN. § 82-11-207 (2013); UTAH CODE ANN. § 40-6-8(4) (West 2013).

⁷⁹ ARK. CODE ANN. § 15-72-309(a)(1) (West 2011); CAL. PUB. RES. CODE § 3642 (West 2001); FLA. STAT. ANN. § 377.28(5)(b)(2) (West 2014); GA. CODE ANN. § 12-4-45(a)(2)(E) (West 2010); MICH. COMP. LAWS ANN. § 324.61706 (West 1999); MISS. CODE ANN. § 53-3-107 (West 1999); MO. ANN. STAT. § 259.120.3(1) (West 2001); NEB. REV. STAT. § 57-910.03(5)(d) (2010); N.M. STAT. ANN. § 70-7-8(A) (West 2003); OR. REV. STAT. § 520.290(1)(a) (2013); S.C. CODE ANN. § 48-43-350(D) (2008); WASH. REV. CODE ANN. § 78.52.335(6)(a) (West 2005); W. VA. CODE ANN. § 22C-9-8(a)(4) (West 2006).

⁸⁰ COLO. REV. STAT. ANN. § 34-60-118(5) (West 2006); WYO. STAT. ANN. § 30-5-110(f) (West Supp. 2014).

⁸¹ MONT. CODE ANN. § 82-11-207 (2013); N.M. STAT. ANN. § 70-7-8 (West 2003); N.D. CENT. CODE ANN. § 38-08-09.05 (West 2008).

⁸² N.M. STAT. ANN. § 70-7-8 (2003).

participating owners who control 75% or more of the interests to ratify a forced pooling order, and (2) two or more non-consenting landowners to control greater than 25% of the interests to block a forced pooling application.⁸³

While minimum acreage control requirements can impose unwanted drilling operations on non-consenting landowners, the requirements also encourage well operators and landowners to enter voluntary drilling agreements. Theoretically, the higher a state's minimum acreage control percentages, the more incentive there is for well operators and landowners to voluntarily enter oil and gas leases.

Minimum acreage control percentages encourage well operators to voluntarily enter leases because even when well operators have entered into leases with the required percentage of landowner interests, state approval of forced pooling applications is sometimes still discretionary; the decision to approve or deny the forced pooling applications is based on the overarching purposes of states' oil and gas laws.⁸⁴ This encourages well operators to avoid the time, expense, and uncertainty of forced pooling hearings entirely by designing drilling units to avoid non-consenting owners' lands, or voluntarily entering leases with all landowners in a spacing unit.⁸⁵ Because preventing waste and protecting correlative landowners' rights are two primary purposes of pooling laws, if this is not possible, well operators still have an incentive to submit an application that demonstrates to the state board or commission the operator exhausted all opportunities to reach voluntary agreements.

Minimum acreage control percentage requirements also provide landowners with incentives to voluntarily enter drilling agreements with well operators.⁸⁶ The rights of landowners who fail to voluntarily enter oil and gas leases are governed by state non-consenting landowner schemes.⁸⁷ While these schemes vary, most provide non-consenting landowners with oil and gas payments that are monetarily less than what landowners can negotiate if they voluntarily lease their lands. For instance, a state's default royalty interest option for a landowner may only be 12.5%,⁸⁸ but a landowner may be able to negotiate a more favorable payment as a

⁸³ *Id.*

⁸⁴ See generally Neal, *supra* note 23, at 161 (describing if voluntary pooling can't be obtained, it may be forced upon the owners).

⁸⁵ See generally *id.* However in some states, the lessee faces penalties. See Vaughn, *supra* note 36, at 115–18 (arguing that in Texas, a “[l]essee may expose [her]self to additional expenses or lawsuits if all interests touched by the well bore are not pooled”).

⁸⁶ Similarly, knowing that a well operator must enter agreements with a minimum percentage of the interests provides additional bargaining power to landowners who can act cooperatively and negotiate with well operators as a group, rather than individually.

⁸⁷ See discussion *infra* Part D.3.

⁸⁸ See, e.g., COLO. REV. STAT. § 30-40-116(7)(b)(II)(c) (West 2006); 225 ILL. COMP. STAT. ANN. 7.25/23.11 (West 2007); KY. REV. STAT. ANN. § 353.650(1) (West 2011).

participating owner.

C. Treatment of Non-consenting Landowners

Landowners who lease their mineral development rights and join the drilling venture as participating owners, do so at the risk of being responsible for costs if the well is not profitable. Non-consenting landowners who are forced into the pooling agreements that extract oil or gas from their property are entitled to payment by well operators, but can avoid the risks of unprofitable wells because they are not required to pay any upfront well drilling or operation costs.⁸⁹ As Professor Bruce Kramer⁹⁰, an expert in oil and gas law, explained, states' treatment of non-consenting landowners' risk can be classified into four categories.⁹¹ "Free Ride" states do not penalize non-consenting owners who do not enter voluntarily into pooling agreements. "Risk Penalty" states and "Option" states provide incentives for non-consenting owners to enter voluntary pooling agreements. "Silent" states create neither an incentive nor a disincentive for landowners voluntarily entering into pooling agreements.

1. Free Ride States

Alaska, Arizona, Indiana, Iowa, Missouri, and North Carolina have "Free Ride" non-consenting landowner frameworks.⁹² Free Ride states allow non-consenting owners to receive profits from wells after operators recover non-consenting owners' share of costs.⁹³ Essentially, well operators and/or participating owners assume all the risk of unprofitable wells (i.e. wells that fail to produce oil or gas in commercial quantities) by fronting non-consenting owners' share of costs, and then being reimbursed when well production begins.⁹⁴

These states' reimbursement systems can be classified into two categories.⁹⁵ Indiana and North Carolina allow operators to charge actual

⁸⁹ Kramer, *supra* note 6, at 256–61.

⁹⁰ Bruce M. Kramer, Texas Tech University School of Law Professor Emeritus, is a renowned oil and gas law scholar. He is the author and co-author of several books, including *William and Meyers, Oil and Gas Law* (5th ed. abridged Lexis Nexis 2013).

⁹¹ Kramer, *supra* note 6, at 261. This section uses Kramer's explanation and categorization of treatment of non-consenting landowners. "State compulsory pooling and unitization statutes utilize a . . . set of four alternatives in order to force a non-consenting working interest owner to pool or unitize his interests with those other operators working to develop the mineral interests." *Id.* at 261. This subsection updates Kramer's original analysis and provides additional information on the treatment of non-consenting landowners in states' forced pooling laws. We are indebted to his original categorization and analyses.

⁹² See ALASKA STAT. ANN. § 31.05.100(c) (West 2007); ARIZ. REV. STAT. ANN. § 27-505(A) (2000); IOWA CODE ANN. §§ 458A.8–10 (West 2013); N.C. GEN. STAT. ANN. §113-393(a) (West 2010). See generally IND. CODE ANN. § 14-37-9-3 (West 2011); MO. ANN. STAT. § 259.130 (West 2001).

⁹³ Kramer, *supra* note 6, at 261–63.

⁹⁴ *Id.*

⁹⁵ See *id.* at 262–63 (refining the three categories into two fundamental cases).

expenses proportionate to non-consenting owners' share of production.⁹⁶ Non-consenting landowners receive no profits until the parties who covered those costs recover those costs.⁹⁷ The other four states function similarly, but also grant the parties who covered non-consenting landowners' costs a statutory lien that may be sold to cover the non-consenting landowners' costs.⁹⁸

The problem with allowing non-consenting owners a free ride is that these landowners can balance the potential benefits of voluntarily pooling their interests against the risk of an unprofitable venture. However, because there is no risk for non-consenting landowners, these landowners have little incentive to voluntarily enter into oil and gas agreements. Free Ride states make it more difficult for well operators to reach minimum acreage control percentage thresholds, and are less likely to prevent waste and protect the correlative rights of participating landowners.

2. Silent States

California, Georgia, Michigan, and Oklahoma do not have detailed statutory frameworks addressing non-consenting owners.⁹⁹ Each of these states' statutes provide blanket terms requiring that forced pooling orders "be fair and reasonable under all circumstances."¹⁰⁰

Georgia's scheme resembles some Free Ride schemes because it provides well operators with a lien on production from tracts that have not paid their share of charges.¹⁰¹ While Alaska and Arizona have similar provisions,¹⁰² Georgia specifies little else, such as whether well operators can recover non-consenting owners' costs from production revenue.¹⁰³

Michigan does not elaborate on treatment of non-consenting owners. However, Michigan's statute provides that forced pooling orders must include a "[p]rovision for carrying or otherwise financing a person who elects to be carried or otherwise financed, [while] allowing a reasonable interest and service charge payable out of the person's share of

⁹⁶ IND. CODE ANN. § 14-37-9-3 (West 2011); N.C. GEN. STAT. § 113-393(a) (West 2010).

⁹⁷ Kramer, *supra* note 6, at 262.

⁹⁸ See, e.g., MO. ANN. STAT. § 259.130 (West 2001) ("A person to whom another is indebted for expenses incurred in drilling and operating a well on a drilling unit required to be formed as provided for in section 259.110, may, in order to secure payment of the amount due, fix a lien upon the interest of the debtor in the production from the drilling unit or the unit area, as the case may be, by filing for record, with the recorder of deeds of the county where the property involved, or any part thereof, is located, an affidavit setting forth the amount due and the interest of the debtor in such production.")

⁹⁹ See generally CAL. PUB. RES. CODE § 3647 (West 2001); GA. CODE ANN. § 12-4-45(a) (West 2010); MICH. COMP. LAWS ANN. § 324.61705 (West 1999); OKLA. STAT. ANN. tit. 52, § 87.1(e) (West Supp. 2014).

¹⁰⁰ MICH. COMP. LAWS ANN. § 324.61705 (West 1999) ("The order of the supervisor shall be upon terms and conditions that are fair, reasonable, and equitable . . .").

¹⁰¹ GA. CODE ANN. § 12-4-45(a)(2)(D)(v)-(vii) (West 2010).

¹⁰² ALASKA STAT. ANN. § 31.05.100(c) (West 2007); ARIZ. REV. STAT. ANN. § 27-505(A) (2000).

¹⁰³ See generally GA. CODE ANN. § 12-4-45(a)(2)(D)(v)-(vii) (West 2010).

production.”¹⁰⁴

While California’s law is also generally silent as to non-consenting landowners, California allows non-consenting landowners to sell their interests.¹⁰⁵ Participating landowners may purchase non-consenting owners’ interests.¹⁰⁶ In practice, this framework is similar to a Free Ride system because there is no cost risk associated with selling the mineral interests in land; buyers assume non-consenting owners’ risk associated with unprofitable wells.

3. Risk Penalty States

Several states try to incentivize voluntary pooling by applying a risk penalty to non-consenting owners.¹⁰⁷ While non-consenting landowners in Risk Penalty states do not assume the risk of unprofitable wells and have no upfront costs, the risk of a penalty on wells’ profits encourage landowners to (1) voluntarily enter oil and gas agreements, (2) promote natural resource production, and (3) protect other landowners’ correlative rights.

[Table 3 on next page]

¹⁰⁴ MICH. COMP. LAWS ANN. § 324.61705(e) (West 1999).

¹⁰⁵ CAL. PUB. RES. CODE § 3647 (West 2001).

¹⁰⁶ *Id.*

¹⁰⁷ See *infra* Table 3.

Table 3. States with risk penalties based on costs attributable to non-consenting owners.

Fixed or Flexible Penalty	State ¹⁰⁸	Total Cost or Classified Cost Penalty	Penalty Amount
Fixed	AL	Total Costs	150%
Fixed	LA	Total Costs	100%
Fixed	MT	Classified	200% of set up costs until first production; 100% of costs thereafter
Fixed	NE	Classified	200% of set up costs; 100% of equipment costs; 100% of continuing operation costs
Fixed	NV	Total Costs	300%
Fixed	NM	Total Costs	200%
Fixed	ND	Total Costs	200%
Fixed	OR	Total Costs	300%
Fixed	TN	Total Costs	350%
Flexible	OH	Total Costs	No greater than 200%
Flexible	TX	Total Costs	No greater than 100%
Flexible	UT	Classified	100% of surface equipment, operating costs, plugging and abandoning the well; plus 150-400% of costs related to well site preparation including wellhead connections
Flexible	VT	Total Costs	No greater than 300%
Flexible	WY	Classified	100% of surface equipment, operating costs, plugging and abandoning the well; 200% of equipment costs including wellhead connections and equipment in the well; and up to 300% of costs related to well site preparation and drilling.

¹⁰⁸ ALA. CODE § 9-17-13(c)(5) (2001); LA. REV. STAT. ANN. § 30:10(A)(2)(b)(i) (Supp. 2015); MONT. CODE ANN. 82-11-202(2)(b) (2013); NEB. REV. STAT. § 57-909(2) (2010); NEV. REV. STAT. ANN. § 522.060.4 (West 2000); 19 N.M. Reg. 1112 (Dec. 1, 2008); N.D. CENT. CODE ANN. § 38-08-08(3)(a) (West 2008); OHIO REV. CODE ANN. § 1509.27(F) (West 2013); OR. ADMIN. R. 632-010-0161(6)(b) (2013); TENN. CODE ANN. § 60-1-202 (West 2014); TENN. COMP. R. & REGS. 0400-55-01-.01(d) (2011); TEX. NAT. RES. CODE ANN. § 102.052 (West 2011); UTAH CODE ANN. § 40-6-6.5(d)(i) (West Supp. 2014); VT. STAT. ANN. tit 29, § 523(c) (West 2007); WYO. STAT. ANN. § 30-5-109(g) (West Supp. 2014).

Risk Penalty states define the risk as a percentage of non-consenting owners' share of drilling and operation costs.¹⁰⁹ For example, in New Mexico, if a well cost one million dollars and a landowner owned 10% of the land in that well's drilling unit, that landowner's cost risk would be \$100,000. However, if the landowner were a non-consenting landowner, her penalty would be 200% (\$200,000) of costs, which would be paid before she received any well profits.¹¹⁰

Some states allow risk penalty flexibility by providing the hearing officer, or a board adjudicating the forced pooling order, with discretion in assessing the risk penalty.¹¹¹ In these states, penalties can be tailored (within a statutorily, or regulatory, defined range) to individual non-consenting landowners based on their share of risks.¹¹² For example, if a proposed drilling unit in Utah included two non-consenting owners, representing 25% and 4% percent of the drilling unit, respectively, the hearing officer could take into account the drilling operation risks and assess different penalties on each non-consenting owner. In this case, the hearing officer might impose a higher percentage penalty against the landowner owning 25% of the drilling unit because she was more necessary to the proper configuration of the drilling unit.

Some Risk Penalty states' penalties are based on total costs while others are based on classified costs.¹¹³ Seven states' penalties are based on a flat percentage of all costs (e.g., Alabama's penalty is 150% of all costs).¹¹⁴ Three other states (Ohio, Texas, and Vermont) allow hearing officers or boards to set penalties up to a maximum percentage of total costs.¹¹⁵ Four Risk Penalty states impose a penalty based on different drilling and operating cost classifications.¹¹⁶ For example, Montana provides a fixed 200% penalty on set up costs and first production equipment costs (e.g., setting up the drilling rig and the equipment used before wells first produce petroleum resources).¹¹⁷ Montana essentially eliminates the risk penalty for non-consenting landowners on later costs, such as those associated with new equipment and continuing operation, because the penalty on these costs is only 100%.

¹⁰⁹ Kramer, *supra* note 6, at 259–60.

¹¹⁰ *Id.* at 264–65; *see also supra* Table 3.

¹¹¹ *See supra* Column 1 of Table 3.

¹¹² *Id.* While flexible penalties are subject to judicial review, fixed risk penalties are generally not.

¹¹³ *See supra* Column 3 of Table 3.

¹¹⁴ ALA. CODE § 9-17-13(c)(4)–(5) (2001); LA. REV. STAT. ANN. § 30:10(A)(2)(b)(i) (Supp. 2015); NEV. REV. STAT. ANN. § 522.060.4 (West 2000); 19 N.M. REG. 1112 (Dec. 1, 2008); N.D. CENT. CODE ANN. § 38-08-08(3)(a) (West 2008); OR. ADMIN. R. 632-010-0161(6)(c) (2013); TENN. COMP. R. & REGS. 0400-55-01-.01(d) (2011).

¹¹⁵ OHIO REV. CODE ANN. § 1509.27(F) (West 2013); TEX. NAT. RES. CODE ANN. 102.052(a) (West 2011); VT. STAT. ANN. tit. 29, § 523(c) (West 2007).

¹¹⁶ MONT. CODE ANN. § 82-11-202(2)(b) (2013); NEB. REV. STAT. § 57-909(2) (2010); UTAH CODE ANN. § 40-6-6.5(d)(i) (West Supp. 2014); WYO. STAT. ANN. § 30-5-109(g)(ii) (West Supp. 2014).

¹¹⁷ MONT. CODE ANN. § 82-11-202(2)(b)(ii) (2013).

Most states' Risk Penalty frameworks require non-consenting landowners to pay operators a percentage penalty.¹¹⁸ Alabama has a unique system that is a hybrid between the Free Ride and Risk Penalty schemes.¹¹⁹ It allows well operators to charge non-consenting owners a penalty of 150% of costs.¹²⁰ Well operators who decide not to impose the penalty provide non-consenting owners a free ride.

4. Option States

Fifteen states allow non-consenting landowners to select one of several alternatives when they are integrated into a well-spacing unit.¹²¹ There is considerable variation among these states, but most provide non-consenting landowners at least two choices.

[Table 4 on next page]

¹¹⁸ For example, Louisiana's statute states that if an "owner elect[s] not to participate in the risk and expense of the [proposed] well[.]" such owner shall be deemed a nonparticipating owner, and the drilling owner well operator "*shall* . . . be entitled to own and recover out of production . . . [the] allocated share . . . together with a risk charge[.] [The] risk charge shall be one hundred percent of . . . costs of drilling . . . and completing the . . . well." LA. REV. STAT. ANN. § 30:10(A)(2)(b)(i) (2007) (emphasis added).

¹¹⁹ See generally ALA. CODE § 9-17-13(c)(5) (2001) (describing Alabama's complex regulatory scheme).

¹²⁰ *Id.*

¹²¹ See *infra* Table 4.

Table 4. States that provide options to non-consenting landowners.

State ¹²²	Do Landowners have the Option to Transfer or Lease Mineral Interest for Just Compensation?	Can Landowners Elect to have Costs Financed by Well Operators or Participating Landowners?	Risk Penalty	Royalty Interest
AR	Yes	-	Fixed by state oil and gas commission	-
CO	-	-	100% surface equipment and operating costs; 200% development costs and new well equipment	1/8th Profits until costs recovered
FL	Yes	-	300% of total costs	-
ID	Yes	Yes	-	-
IL	Yes	-	100%-300% of total costs	1/8th Profits
KS	Yes	Yes	100% of surface equipment; 300% of remaining costs	-
KY	Yes	-	200% of total costs	1/8th Profits
MS	Yes	-	100% of new surface equipment; 100% of costs after first production; 250% of well site preparation and drilling and well equipment	-
NY	-	-	200% of total costs	1/8th Profits
PA	Yes	-	200% of total costs	-
SC	Yes	Yes	-	-
SD	Yes	-	150%-250% of total costs	-
VA	Yes	-	300% if tract is leased, but only 200% if tract is not subject to a lease	-
WA	Yes	Yes	100% of surface equipment; 150% of well site preparation and drilling; 150% of well equipment	1/8th Profits
WV	Yes	Yes	-	-

¹²² ARK. CODE ANN. § 15-72-304(b) (West 2011); COLO. REV. STAT. ANN. § 34-60-116(7)(b) (West 2006); FLA. STAT. ANN. § 377.2411 (2)(a)-(b) (West 2014); IDAHO CODE ANN. § 47-322(c) (West 2006); 225 ILL. COMP. STAT. ANN. 725/22.2(f) (West 2007); KAN. STAT. ANN. § 55-1305(g) (2005); KY. REV. STAT. ANN. § 353.640(3) (West 2011); MISS. CODE ANN. § 53-3-7 (West Supp. 2013); N.Y. ENVTL. CONSERV. LAW § 23-0901-3(a)(1) (McKinney 2007); 58 PA. STAT. ANN. § 408(c) (West 1996); S.C. CODE ANN. § 48-43-340(C) (2008); S.D. CODIFIED LAWS § 45-9-33 (2004); VA. CODE ANN. § 45.1-361.21(C)(7) (West 2014); WASH. REV. CODE ANN. § 78.52.250(2)(b) (West 2005); W. VA. CODE ANN. § 22C-9-7(a)(5)-(6) (West 2006).

Twelve states allow non-consenting owners to transfer, or lease, their mineral rights to the participating owners, or the well operator, in exchange for compensation.¹²³ This can eliminate some opposition to drilling by allowing non-consenting owners to receive an upfront payment for their rights and no longer be involved in the drilling process. This alternative is similar to a risk-free option because non-consenting landowners do not share any risk for unprofitable wells. However, there is a drawback: the non-consenting landowners generally receive less compensation than they would have received as participating landowners.

The second alternative is similar to penalty schemes in Risk Penalty states.¹²⁴ The penalties vary both in terms of the percentage and the costs the penalty is based on, with some states using a percentage of non-consenting owners' total costs,¹²⁵ some differentiating penalties based on surface equipment costs versus development and operation costs,¹²⁶ and others using flexible cost percentages.¹²⁷ Interestingly, Arkansas provides non-consenting owners an option that combines *both* the ability to transfer, or lease, oil and gas interests to well operators, or participating owners, and risk penalty.¹²⁸ Non-consenting owners in Arkansas can (1) permanently transfer their interest in exchange for compensation, or (2) temporarily transfer, or lease, their interest to participating owners and well operators until parties recover the non-consenting owners' proportion of costs plus a monetary risk penalty determined by the state's oil and gas commission.¹²⁹

A third alternative—available in about one-third of the Option states—is a royalty interest.¹³⁰ This provides non-consenting owners with a royalty interest of at least one-eighth of their share of wells' profits, without being responsible for drilling and operation costs.¹³¹

Several states provide combinations of these alternatives. For example, in addition to the transfer/lease and risk penalty alternatives, Arkansas allows non-consenting owners the option to reimburse participating owners who carried their share of up-front costs.¹³² Some states provide non-consenting landowners with a financing option, allowing

¹²³ See *supra* Column 2 of Table 4.

¹²⁴ See *supra* Column 4 of Table 4.

¹²⁵ KY. REV. STAT. ANN. § 353.640(3) (West 2011); N.Y. ENVTL. CONSERV. ANN. § 23-0901-3(a)(1) (McKinney 2007); see also ARK. CODE ANN. § 15-72-304(b) (West 2011); FLA. STAT. ANN. § 377.2411(2)(a)–(c) (West 2014); 58 PA. STAT. ANN. § 408(c) (West 1996).

¹²⁶ COLO. REV. STAT. ANN. § 34-60-116(7) (West 2006); KAN. STAT. ANN. § 55-1305 (2005); MISS. CODE ANN. 53-3-7 (West Supp. 2013); WASH. REV. CODE ANN. § 78.52.250(2) (West 2005).

¹²⁷ 225 ILL. COMP. STAT. ANN. 725/23.8 (West 2007); S.D. CODIFIED LAWS § 45-9-33 (2004).

¹²⁸ ARK. STAT. ANN. § 15-72-304(b)(4) (West 2011).

¹²⁹ *Id.*

¹³⁰ See *supra* Column 5 of Table 4.

¹³¹ COLO. REV. STAT. ANN. § 34-60-116(7)(c) (West 2006); IDAHO CODE ANN. § 47-322(c) (West 2006); KY. REV. STAT. ANN. §§ 353.650(1), (3) (West 2011); N.Y. ENVTL. CONSERV. LAW § 23-0901-3(a)(1) (McKinney 2007); WASH. REV. CODE ANN. § 78.52.250(2)(a) (West 2005).

¹³² See ARK. STAT. ANN. § 15-72-304 (West 2011).

these landowners the option to join as a full participating owner, but have their share of the costs be paid for up front by the well operators or other participating owners.¹³³ States that provide this option differ on whether to combine this alternative with a risk penalty.¹³⁴ The majority of these states combine it with a risk penalty.¹³⁵

States that provide non-consenting landowners with multiple alternatives arguably best address the dichotomy between waste prevention, energy resource development, and correlative rights. As Professor Kramer suggests, states providing alternatives in forced pooling laws represent the marketplace more accurately because the laws mimic some of the options available to operators seeking to persuade landowners to voluntarily pool and participate in the production.¹³⁶ The variety of options provided by these states may eliminate or lessen opposition to drilling operations. For example, a royalty option allows non-consenting landowners, who otherwise have no choice but to be part of the drilling operations, to receive some compensation without being involved in the process.

V. CONCLUSION

High-volume hydraulic fracturing has renewed interest in how states' oil and gas laws balance resource development and landowner rights. While spacing regulations and forced pooling laws allow states to promote greater recovery of energy resources—therefore maintaining a balance between property rights and development—they also force some unwilling landowners to allow the extraction of oil or gas from their property.

States' well spacing and forced pooling laws determine the number of landowners who involuntarily must allow oil and gas extraction from their lands. States encourage well operators to voluntarily lease oil and gas rights from more landowners when they allow longer well setbacks, larger spacing units sizes, higher minimum acreage control percentages, and risk penalty and option non-consenting landowner treatments.

States' mechanisms to protect individual property and correlative rights of neighboring landowners, preventing waste and promoting energy

¹³³ See *supra* Column 3 of Table 4.

¹³⁴ See, e.g., 58 PA. STAT. ANN. § 408(c) (West 1996) (“[An owner may] elect to . . . [be] carried . . . upon terms and conditions determined by the [State Oil and Gas] [C]ommission that are just and reasonable.”).

¹³⁵ S.D. CODIFIED LAWS § 45-9-33 (2004); WASH. REV. CODE ANN. § 78.52.250(2) (West 2005); see also 58 PA. STAT. ANN. § 408(c) (West 1996); VA. CODE ANN. § 45.1-361.21(C) (West 2014).

¹³⁶ Kramer, *supra* note 6, at 274 (“States that authorize the use of alternatives provide a more realistic replica of the actual marketplace for working interests and, therefore, more closely achieve what the market cannot do because of the rule of capture. As stated earlier, operators who seek to jointly operate a pool or reservoir have several choices available to them in order to persuade the other owners to join their venture. By giving the administrative agency the same kind of alternatives, the agency can tailor an order which reflects what the market would bear were it not for the impediments placed in the road to voluntary agreements.”).

resource development, change over time. For example, with regard to the treatment of non-consenting landowners, ten of the thirty-nine states with forced pooling laws have altered how they treat non-consenting landowners in their forced pooling laws by eliminating Free Ride and Silent frameworks and replacing them with Risk Penalty and Option frameworks.¹³⁷ This suggests that states are realizing the problems presented by forced pooling orders, and are increasingly incentivizing voluntary pooling so landowners and well operators can agree on oil and gas extraction terms.

Table 5. States that amended their treatment of non-consenting landowners in pooling laws between 1986 and 2012.

	Non-Consenting Landowner Framework in 1986				Non-Consenting Landowner Framework in 2012			
	Free Ride	Silent	Risk Penalty	Option	Free Ride	Silent	Risk Penalty	Option
AL	X	-	-	-	-	-	X	-
CO	-	-	X	-	-	-	-	X
FL	X	-	-	-	-	-	-	X
KS	-	X	-	-	-	-	-	X
MT	X	-	-	-	-	-	X	-
NV	X	-	-	-	-	-	X	-
NY	-	-	X	-	-	-	-	X
ND	X	-	-	-	-	-	X	-
OR	-	X	-	-	-	-	X	-
TN	-	X	-	-	-	-	X	-

¹³⁷ See discussion *supra*. This analysis is an extension of Kramer's *supra*. See generally Kramer, *supra* note 6. Importantly, it allows a comparison of current laws with those in effect in 1986, about the time that shale hydraulic fracking technology began to be commercially employed in Texas's Barnett Shale. *Id.*

