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Stephen L. McDonald

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UNIT OPERATION OF OIL RESERVOIRS AS AN INSTRUMENT OF CONSERVATION

*Stephen L. McDonald**

I. Introduction

It is now generally understood among those acquainted with the process of recovering¹ oil from natural underground reservoirs that the physical efficiency of the process, as measured by the ratio of oil recovered to oil originally in place, usually can be increased by artificially assisting or supplementing the natural expulsive forces. It is also widely appreciated that some of the most productive techniques of assisted recovery are feasible only if the reservoirs in question are operated as units. This knowledge, together with the official identification of conservation with physical waste prevention, underlies the efforts of the federal government and the producing states, in their respective jurisdictions, to encourage and facilitate the unitization of reservoirs in which there are two or more lessee-operators or royalty owners for the purpose of increasing the efficiency of oil recovery.

Statutes and regulations should go beyond mere encouragement and facilitation; they should require unitization of every oil reservoir within a reasonable time following discovery. Furthermore, unit operation should supplant all present regulations (*e.g.*, of well spacing and production rates) except those designed to protect other resources from damage by oil operations. Unit operation, with the indicated qualification, is a sufficient instrument of conservation. Before proceeding, it is necessary to review some technical facts, indicate the nature of present regulation, and define conservation in a meaningful way.

II. Pertinent Technical Characteristics of Crude Oil Production

Crude oil in commercial quantities is found where geologic formations of impermeable material block the vertical and lateral migration of lighter oil particles in the (salt) water saturating certain tilted strata of porous rock.² Such geologic traps form natural reservoirs in which oil particles accumulate on top of the accompanying water in what oilmen call "pools." Commonly associated with oil is natural gas, which may accumulate as a "cap" on top of the oil or, if reservoir pressure is high enough, may be partially or wholly dissolved in the oil. The fluids in the reservoir are under natural pressure which varies directly with depth beneath the surface. Wells tapping the reservoir create points of relatively low pressure, so that the fluids tend to flow through the permeable reservoir rock into the well bores and to the surface. As fluids are removed from the

* Professor of Economics at the University of Texas at Austin.

1 *Recovery* is a term of art in the oil industry synonymous with extraction or production.

2 For fuller but not highly technical treatments of the subject see: S. BUCKLEY, *PETROLEUM CONSERVATION* (1951); N. CLARK, *ELEMENTS OF PETROLEUM RESERVOIRS* (1960); and ENGINEERING COMMITTEE, INTERSTATE OIL COMPACT COMMISSION, *OIL AND GAS PRODUCTION: AN INTRODUCTORY GUIDE TO PRODUCTION TECHNIQUES AND CONSERVATION METHODS* (1951).

reservoir and not artificially replaced, pressure in the reservoir declines and the flow of oil to the well bores diminishes accordingly. If oil is extracted slowly enough, gravity maintains the segregation of associated gas and water, and the expansion or recharge of these fluids drives the oil to the well bores by a displacement process.³ Since reservoirs are usually tilted to some degree, the expansion of gas or water drives the oil laterally as well as vertically in the reservoir, so that some wells initially producing oil gradually become gas or water producers as the gas-oil or water-oil interface passes them. These wells produce during their commercial life less oil than is originally in place beneath them, while wells lying in the direction in which oil is driven produce more—sometimes many times more.

The physical efficiency of the oil recovery process depends in part on some natural factors over which oil operators have little or no control, such as porosity and permeability of the reservoir rock, viscosity of the oil, temperature and pressure in the reservoir, and the alternative natural drives available. In spite of these factors physical efficiency usually depends significantly on the rate of oil extraction. If the rate of extraction exceeds some critical level, commonly known as the maximum efficient rate or MER, gravity can no longer keep gas and water segregated from oil; these less viscous fluids form channels through the oil to producing wells, bypassing pockets of oil and, as produced at the wells, depleting reservoir pressure. Once natural pressure is exhausted, it may not be economically feasible to recover the remaining unproduced oil by secondary means (*e.g.*, artificial repressuring or water flooding). Physical losses in the form of unrecovered oil may thus result from an excessive rate of extraction.

As a general rule, once sufficient wells have been drilled in a reservoir to reveal its areal extent, variations in thickness, potentially recoverable reserves, alternative natural drives and other operating characteristics—knowledge essential to establishing relative property rights and determining the maximum rate of production consistent with no loss of recoverable oil—the physical efficiency of oil recovery will not be increased by increasing the number of producing wells. Due to the fluid character of reservoir contents and the pressure-differential nature of production, the wells essential to information gathering are usually adequate in number and location to drain a reservoir eventually. Additional wells are of use only to increase the rate at which oil may be extracted since the feasible rate of production from a reservoir, given its degree of depletion, varies directly with the number of producing wells.

III. Problems and the Regulatory Response

It is readily seen from the above discussion that where there are two or more lessee-producers operating in a common reservoir, the capacity of oil to flow freely in the reservoir to points of relatively low pressure creates the possibility of inducing a flow across property lines. The operator who drills more wells on his lease or produces at a faster rate than his neighbors can drain oil from their

³ Where gas is dissolved in oil, *drive* is provided by expansion of the oil as pressure is released. Once pressure has fallen enough, gas comes out of solution and, if confined to the reservoir, forms a cap.

sectors of the reservoir to his. In the absence of agreement among operators or preventive regulation this possibility, together with the "rule of capture"⁴ theory as the governing law of property in recovered oil, leads to dense drilling and capacity operation of wells as operators compete for the available oil and gas in a common reservoir. The results of such competition include unnecessary investment in wells with correspondingly higher production costs; uncontrolled production of associated gas, often disposed of by flaring, and rapid depletion of reservoir pressure; progressively increasing production of salt water as it advances across the reservoir and channels through the sector containing oil with corresponding depletion of reservoir pressure and damage to soil and fresh water from surface disposal of brine; production of oil in excess of the immediate capacity of transportation and marketing facilities, necessitating makeshift surface storage (*e.g.*, in open pits) with loss due to leakage, fire, and evaporation; and loss in the reservoir of oil otherwise recoverable due to an excessive rate of production. It is clear from this enumeration that unrestricted competition among operators in a common oil reservoir, resulting from the independent efforts of each operator to protect or enhance the value of his property, is wasteful of capital in the development of oil discoveries (thus discouraging to exploration), is conducive to environmental damage, and is inconsistent with the efficient recovery of oil.

In general, the producing states and the federal government have reacted to these problems by seeking to restrain individual operators in their competitive efforts rather than by removing the motivation to compete for available oil in a common reservoir. They have enacted statutes⁵ and imposed regulations: to restrict the density of development wells in each newly discovered reservoir while requiring the centering of wells on plots of uniform size and shape; to prohibit or limit the flaring of gas; to require measures in the drilling and plugging of wells and in the disposal of wastes such as salt water that minimize damage to fresh water, soil, and other valuable resources; to prevent wasteful surface storage and the creation of fire hazards; to restrain production of oil in each reservoir to its maximum efficient rate (MER), or in Texas, Louisiana, Oklahoma, Kansas and New Mexico to the least of its MER, its share of statewide market demand, or the capacity of transportation and marketing facilities; to allocate the total allowable monthly production in a reservoir among producers, usually in proportion to number of wells operated or acreage drained, as a means of protecting their correlative rights;⁶ to encourage secondary recovery in old fields wastefully exploited in an earlier era; and to facilitate the formation of units by

4 Key cases in the development of the rule of capture are: *Westmoreland and Cambria Natural Gas Co. v. DeWitt*, 130 Pa. 235, 18 A. 724 (1889); *Kelly v. Ohio Oil Co.*, 57 Ohio St. 317, 49 N.E. 399 (1897); *Barnard v. Monongahela Natural Gas Co.*, 216 Pa. 362, 65 A. 801 (1907).

5 See *e.g.*, TEX. REV. CIV. STAT. art. 6004-6066d (1962); COLO. REV. STAT. ANN. §§ 100-6-1 to 22 (1963).

6 The model oil conservation statute prepared by the Interstate Oil Compact Commission defines "protection of correlative rights" to mean that regulation "should afford a reasonable opportunity to each Person entitled thereto to recover or receive the Oil and Gas in his tract or tracts or the equivalent thereof, without being required to drill unnecessary wells or incur other unnecessary expense. . . ." INTERSTATE OIL COMPACT COMMISSION, A FORM FOR AN OIL AND GAS CONSERVATION STATUTE 2 (1959). The capitalized words in the quotation are terms elsewhere defined in the statute.

voluntary agreement⁷ among competing interests in common reservoirs for the purpose of secondary recovery, pressure maintenance, or other valid techniques of increasing the efficiency of oil recovery. The statutes and regulations do not positively require assisted or secondary recovery, nor do they allow unitization to substitute for the indicated types of regulation.

There is not space here to make a detailed evaluation of these efforts of the producing states and the federal government to prevent waste in the search for and production of oil.⁸ A few brief comments will have to suffice. Granting at the outset that the indicated regulatory measures as a whole have been helpful, benefiting both the industry and the general public, they are defective in two important ways. First, they do not adequately protect correlative rights, where such rights are defined properly. In the ordinary situation where some wells in a reservoir have structural advantage or disadvantage depending on whether oil is driven toward or away from them by expanding gas or water, producers' rights to the oil originally in place beneath their surface leases are not protected by allowing each well draining a tract of given size to produce at the same rate as every other in the reservoir as long as it can. Wells having structural advantage continue to produce long after they have extracted all the oil originally in place beneath them—their owners thus gaining valuable property at the expense of those whose wells suffer from structural disadvantage. Second, by aiming at physical efficiency—or the prevention of physical waste in the language of the typical conservation statute⁹—existing regulatory measures do not necessarily benefit the industry or society in every instance and certainly do not maximize the benefit we derive from our oil resources over an extended period of time. For example, the limitation of production in a reservoir to the maximum efficient rate, where efficiency is conceived in physical terms, ignores the possibility that the increased recovery of oil at some future date may not be worth, to producers or to society, the required sacrifice of current consumption. Similarly, the gas saved by flatly prohibiting flaring may not be worth the cost of some other disposition, such as returning it to the reservoir to help maintain pressure. In short, if benefit is the aim of conservation, the mere prevention of physical waste is not a satisfactory approach to it. We need a more meaningful definition of oil conservation than the promotion of physical efficiency in its recovery and use.

IV. A Meaningful Definition of Conservation

The proper aim of conservation is to benefit society. If this is accepted, we can then tentatively, and in very general terms, define conservation of oil (or of any other resource) as that manner of recovery and distribution of use over

7 Twenty-one producing states have statutes under which the state conservation commission may order a reservoir unitized if a large majority (60 to 80 percent) of both operating and royalty interests have voluntarily agreed on a unitization plan. *See, e.g.*, ARK. STAT. ANN. §§ 53-115 (SUPP. 1969); KAN. STAT. ANN. §§ 55-1301 to 1315 (SUPP. 1969). For a complete list of the states and some qualifying comments, *see* S. McDONALD, PETROLEUM CONSERVATION IN THE UNITED STATES: AN ECONOMIC ANALYSIS 217-25 (1971).

8 For a detailed evaluation, *see* S. McDonald, *supra* note 7, at 113-226.

9 Most statutes follow the language of the model statute published by the Interstate Oil Compact Commission. For that language, *see* LEGAL COMMITTEE, INTERSTATE OIL COMPACT COMMISSION, A FORM FOR AN OIL AND GAS CONSERVATION STATUTE § 1 (1959).

time which maximizes benefit to society. To make this definition more precise and concrete we must show how to measure benefit and, since time is involved, how to weigh future benefit against present benefit.

Conceptually the benefit derived from the acquisition and use of a good is the net gain in satisfactions by members of society. Acquisition involves sacrifice of satisfactions (*e.g.*, of leisure or command over other goods) and use yields positive satisfactions. If the required sacrifice is less than the resulting gain of satisfactions, then acquisition and use of the good are beneficial. Satisfactions given up or gained are, of course, subjective and not directly measurable; but they are indirectly indicated by the prices we must pay to get people to accept sacrifice and by the prices people are willing to pay to get satisfactions. In well-functioning competitive markets the prices of productive inputs (*e.g.*, wages) tend to measure incremental sacrifice by their owners, and the prices of finished output tend to measure incremental gain of satisfactions by their consumers. Thus, if the cost of an incremental product is less than its price, society benefits from its production. Benefit to society is maximized when for every product incremental cost equals price.

Where time is involved in a production or consumption decision, a special kind of cost is relevant. This is the sacrifice of satisfactions resulting from the postponement of consumption. In competitive capital markets the rate of interest tends to equal the incremental sacrifice of this sort. The gain from postponement of consumption is the rate of return on incremental investment. Society benefits from an incremental postponement of consumption when the rate of return exceeds the rate of interest or, equivalently, when future consumption discounted at the rate of interest has a greater value than the consumption presently sacrificed. Social benefits are maximized when postponement of consumption is pushed to the point where on the last increment the discounted value of future consumption just equals the value of the necessary sacrifice of current consumption.

The conservation of a depletable resource such as oil always involves some degree of postponement of consumption or use. Of course, transferring use from present to future allows the saving of some present production costs and requires the incurring of some future production costs. Thus maximizing benefit to society requires pushing postponement to the point where on the last increment the discounted value of net proceeds (value to consumers less production costs) just equals the value of net proceeds currently sacrificed.

These considerations lead to the following precise and concrete definition of oil conservation: *it is that manner of recovery and distribution of use over time which maximizes the present value of oil resources to society, expected future net proceeds from them being discounted at the prevailing rate of interest.* Implied in this definition are at least three propositions: (1) oil and gas physically recoverable will be recovered for current or future use when the discounted value of them exceeds the cost of their recovery; (2) in discovered and developed reservoirs production will be postponed when the discounted value of future net proceeds thereby made possible exceeds the value of current net proceeds sacrificed; (3) exploration for new reserves will be expanded when the discounted

value of expected discoveries, these to be operated in accordance with propositions (1) and (2), exceeds the necessary investment outlays. All of these propositions imply continuous cost-benefit comparisons and action to maximize net benefit to society.

It should be emphasized that the above definition of oil conservation implies current responsiveness to expected future demands for oil. The net proceeds from an increment to current production are weighed against those of an alternative increment to future production, allowing for the postponement cost reflected in the rate of interest. If, given initially a benefit-maximizing distribution of production over time, expected future demand should rise relative to current demand, the corresponding rise in expected future net proceeds would lead to an incremental shift from current to future production. Similarly, a fall in expected future demand would lead to an incremental shift from future to current production. In short, the definition implies that production will always shift incrementally from periods when oil is less valuable to periods when it is more valuable, so that the benefit-maximizing distribution of production over time is continuously sought under changing conditions.

V. Why Unregulated Oil Producers Will Not Adequately Conserve Oil

No doubt it will have occurred to the reader that businessmen in trying to maximize their profits make the same kinds of cost-benefit comparison as those described above. They maximize their profits by pushing production to the point where incremental cost equals price. Where time is involved, as in oil recovery, they push postponement of production to the point where the incremental sacrifice of current net proceeds equals the incremental discounted value of expected future net proceeds. They push exploration and other forms of investment to the point where the incremental outlay equals the increment to the value of new assets acquired. Why, then, if oilmen are businessmen, does their free behavior not result in conservation of oil?

The answer is that in one key respect, where there are two or more oil producers in a common reservoir, oilmen's costs differ from those of society. Specifically, for one among many oilmen operating in a common reservoir, the cost of accelerating current production contains a mitigating element, the *gain* of oil from beneath neighbors' leases, which is not present in the cost to society.¹⁰ Thus, one man's gain is another's loss. Put another way, for the individual operator the sacrifice of future net proceeds from the lease due to the loss of otherwise recoverable oil in the reservoir as a whole is offset in some degree by the gain of current net proceeds from the lease that stems from currently producing oil at the expense of neighbors. Since their costs of accelerating current production are always less than those of society, individual operators acting independently will always produce in the present too rapidly to maximize benefit to society and, to make such a rate of production possible, will drill too many wells. Moreover, because explorers come to expect dense drilling in new dis-

10. Private costs may differ from social costs also when private action leads to environmental damage. Hence current regulation should be revised to prevent or limit such damage.

coveries, the prospective net value to them of new discoveries is diminished, and the margin of profitable exploration is contracted relative to what it would have been with a more rational density of drilling. Thus, on two counts too little oil is made available to future consumers.

VI. The Solution: Unit Operation of Oil Reservoirs

By now it should be evident that the conservation problem in oil results from the combination of the fluid nature of reservoir contents and the multiplicity of property interests in the typical reservoir. It would seem to follow that a solution to the problem is to eliminate one of these circumstances, and since the latter is the only one amenable to change, there is no choice to make. There is available a well-known, widely used device of eliminating the multiplicity of property interests in common oil reservoirs: unitization and unit operation of such reservoirs.

Unitization consists of pooling, by means of agreement or valid order of a conservation commission, the separate property interests in oil and gas to be produced from the affected reservoir; providing for the relative shares of owners in proceeds from production and in costs of development and production; adopting a plan for the development and operation of the reservoir as a unit; and designating one or more operators as manager(s) of the reservoir on behalf of the owners as a whole. Unit operation consists of developing the reservoir and recovering oil and gas from it without regard to property lines, but with a view to benefiting the owners as a whole. As a group enterprise, a reservoir unit is similar in spirit, function, and consequence to a business corporation, although there is no chartering by the state and no taxation of unit profits except as income of the separate owners. An owner of an interest in a unit may sell or bequeath his interest or pledge it as collateral for a loan. The property rights of an owner are modified only with respect to the separate development and operation of his lease.¹¹

It is obvious that once properties in oil and gas output are pooled and shares in costs and revenues fixed, it is no longer possible for an individual operator to gain income by producing faster than his neighbors in a common reservoir. The pertinent costs to the individual operator, his fixed share of the costs of the reservoir as a whole, no longer deviate from those of society; so the aim of maximizing private profit now becomes consistent with maximizing benefit to society. Through their unit manager the operators are induced by profit considerations to speed up current production only when the gain in present net proceeds exceeds the discounted sacrifice of future net proceeds, including in the latter the value of unrecovered oil. They are induced to drill wells in addition to those required for discovery and reservoir information only when the additional investment is less than the gain in discounted net proceeds from the acceleration of recovery made possible. They are induced to adopt techniques

11 For a discussion of the legal aspects of forming a unit see Williams, *The Negotiation and Preparation of Unitization Agreements*, FIRST ANNUAL INSTITUTE ON OIL AND GAS L. AND TAXATION (1949).

of assisted recovery, such as reinjection of produced gas or salt water¹² to maintain pressure, or of secondary recovery when the cost is less than the gain of discounted net proceeds. If unitization of newly discovered reservoirs is routine, explorers come to expect the most socially beneficial development and operation of them, so that they are induced by the comparison of investment outlay with value acquired to expand the margin of exploration to the most socially beneficial point. In short, oil operators are led to take whatever action enhances the value of oil resources to them; their costs and revenues in turn more accurately reflect the sacrifices and satisfactions of society; and their decisions tend to maximize the value of oil resources to society. Such action is what is properly meant by conservation.

It is perhaps incidental, but nonetheless important, that unitization of oil reservoirs is a direct and effective way of protecting correlative rights. Once relative shares in costs and revenues are fixed, it is no longer significant that some wells or leases have structural advantage, for it no longer matters through what wells the oil in the reservoir is recovered. Indeed, the unit manager might drill wells chiefly in the end of the reservoir toward which oil tends to be driven, thus saving the cost of wells that would become water producers at an early date and that would not be useful as water injection wells. It could be provided by statute and regulation that valid unitization agreements must specify relative shares in costs and revenues corresponding to relative shares in oil and gas originally in place, as best that can be determined, so that correlative rights can truly be protected.

Mandatory unitization of all oil reservoirs would have a number of important advantages over the present state and federal systems of conservation regulation. First, and most importantly, it would result in conservation in a meaningful sense. It would harness the ingenuity, enterprise, and energy of profit-motivated businessmen in the interest of society as a whole, and would permit the flexible adjustment of current vs. future recovery under changing circumstances. Second, by holding out to explorers the prospect of being able to develop and produce new discoveries on the most economical terms, it would encourage exploration and contribute to solving the problem, now referred to as the "energy crisis," of equating supplies of oil and gas with growing demand in the years ahead. Third, it would result in true protection of correlative rights. And fourth, it would allow us to dispense with all of the elaborate and expensive machinery of present detailed regulation except that necessary to restrain drilling and production in the preunitization period of information-gathering and to protect the environment from damages from drilling and production activities. I believe these advantages far outweigh the disadvantages; some of the more significant of which shall now be considered.

12 Note that the reinjection of produced salt water combines pressure maintenance with environmentally safe waste disposal. The competitive operator in an *un*unitized reservoir would ordinarily find independent salt water reinjection unprofitable, since he would bear all the costs and get only a part of the benefit. Under unitization, he would bear his share of the costs and get his share of the benefit.

VII. Some Disadvantages or Problems

Numerous discussions of these ideas with oilmen and regulators indicate that they would prefer to continue the present system with which they are familiar. This is particularly true of small, independent oilmen. They object to the idea of unitization being compulsory as if the requirements of present regulation were not. Often these individuals do not appreciate the distinction between physical waste prevention and the maximization of benefit from oil resources. Their usual feelings are that they benefit economically from the present system—particularly the limitation of production to market demand and the allocation of total allowable production among all producers. These limitations tend to support prices and to protect independent producers from discrimination in purchases by major integrated firms. Many, especially small independents, feel that the typical unit manager would be a representative of a major oil company who would not adequately consider their interests. The question of prosecution under antitrust laws is often raised since the members of a unit, representing several otherwise competing firms, in effect combine through their manager to restrain current production for whatever reason. These reactions deserve attention: particularly, three criticisms which seem to have special merit.

A. *Price Stability*

Before conservation regulation in the present pattern was instituted in most major producing states around the 1929-1933 period, each large new discovery of oil was followed by rapid development, uncontrolled production, and sharp reduction in prices at a local level until the depletion of reservoir pressure and consequent decline in output permitted a resurgence of prices after a year or two. Older oilmen have never forgotten this instability, and they value highly the system that restrains production to market demand (implicitly at the going price) and thus supports the going price. Would they have to give up price stability under a regime of universal unitization and unregulated production? The answer is, yes, to some degree but not completely. In the "bad old days" of freedom from any sort of regulation, prices were so unstable because supply was so unresponsive to price: any producer who attempted to reduce output would simply lose oil to his neighbors. But under unitization, supply would be quite responsive to price. A modest decline in current price relative to expected future prices would lead a unit manager to reduce current output in order to take advantage of relatively higher net proceeds to be had in future years. This action would of course tend to limit the decline in current price. So prices would be considerably more stable under the present proposal than in the days before regulation. I doubt, however, that they would be as stable as they are under limitation of output to market demand.

B. *Discrimination Against Small Independent Operators*

Before the institution of the present system of regulation, temporary excess supply not only depressed prices but often left independent producers without

buyers as the major integrated firms gave preference to the product of their own wells. The independents had to produce for makeshift surface storage, with attendant losses from leakage, evaporation and fire, or have oil drained from their leases by integrated neighbors. The limitation of total output to market demand and the allocation of the total among all producers in the affected area effectively eliminate the possibility of purchaser discrimination. Would independents have to give up this protection under my proposal? I think not. As for discrimination within a reservoir, unitization prevents it absolutely since each producer gets his fixed share of reservoir output regardless of the wells through which it comes. As for discrimination among reservoirs, price competition would make it unprofitable. If there were a temporary excess supply and an integrated firm reduced its purchases from a reservoir owned by independents, a small reduction in price at this reservoir would make purchases there more profitable for the integrated firm than sacrificing future net proceeds from its own; for if the integrated firm were maximizing the value of its reservoirs before the fall in price, incremental current net proceeds were exactly equal to the discounted value of incremental expected future net proceeds.

Suppose an integrated firm were unit manager in two reservoirs, owning an eighty percent interest in one and a forty percent interest in the other; and suppose there were a general reduction in demand for oil so that the two reservoirs could not both sell all of their output at the previous most profitable rate of production. Would not the integrated firm discriminate in favor of the reservoir in which it had the larger interest? No. With its shares in each reservoir fixed, the firm would maximize its profits by operating each reservoir at its most profitable rate.¹³ In the face of a decrease in demand its efforts to maintain the initial rates would cause a decline in current price. It would then be profitable to reduce current output in each so as to shift some recovery from present to future. There would then be a new, lower optimum profit rate for each, and it would be in the integrated firm's interest to operate each at that rate. The two reservoirs would share proportionately in the lower demand regardless of the different degrees of ownership by their common manager. These comments depend on the assumption that oilmen seek to maximize their profits in the sense of maximizing the value of expected net proceeds. This is a reasonable assumption although there may occasionally be an operator so bent on injuring a rival that he is willing to accept injury to himself. Perhaps the occasional case would warrant supervision of unit managers by conservation commissions to prevent such clear cases of discrimination as that hypothesized in the example just discussed.

C. *Antitrust Prosecution*

Fear of antitrust prosecution was one of the earliest reactions to efforts to unitize oil reservoirs. To eliminate such fears nearly all of the producing states have enacted statutes¹⁴ specifically exempting unit operations approved by con-

13 It is easy to see that taking production from one reservoir to add to the production of the other would cause *both* reservoirs to be less profitable; so the firm with a fixed share in each must itself suffer a loss of profits.

14 *E.g.*, WYO. STAT. ANN. § 30-222 (1967); TEX. REV. CIV. STAT. art. 6008b, § 5 (1962).

ervation commissions from state antitrust laws. Even in states without such statutes, no unit has ever been prosecuted on antitrust grounds. While there is no comparable federal statute, official policy on federally owned lands is to encourage unitization of oil reservoirs, and the one federal antitrust suit brought against a unit,¹⁵ dismissed before trial, did not challenge unit operation as such but alleged discriminatory marketing practices. In his thorough study of the history of unitization in relation to the antitrust problem, Hardwicke¹⁶ firmly laid to rest the notion that unitization for conservation purposes, as conceived by existing laws, may be in violation of state or federal antitrust laws.

But existing law conceives of conservation as preventing physical waste and does not exempt units from specific regulation for that purpose. So there remains the possibility that an attorney general or a court might view the unregulated actions of a unit for the purpose of conservation as I have defined it (*e.g.*, restraint of current production to get the benefit of expected higher prices in future) as a violation of state or federal antitrust laws. On purely economic grounds there would be no justification for such a view, unless there were collusion among a number of units; for there are thousands of separate reservoirs in this country, each of which if unitized would be comparable to a firm in another industry, and the actions of the operators of no one of these reservoirs could significantly affect the total supply and price of oil. Since the mix of operating firms would vary among reservoirs, as would the firm identities of the unit managers, it probably would be no less difficult for units to collude than firms in another industry of comparable structure. Nor would universal unitization lead to greater concentration of control of oil production. Given the thousands of individual reservoirs that would be unitized, the law of large numbers would result in a firm that presently owns X percent of oil capacity in the country being the principal owner in X percent of reservoirs and likely being appointed unit manager of such proportion of reservoirs. There is no reason why the large companies should be more able to wrest control from independent producers.

If there would be thousands of separate units, no one of which could significantly affect supply and price; if collusion would be unfeasible, due to great numbers geographically dispersed and various combinations of owners in different units; if concentration of control would not be increased; then, there is no reason on economic grounds for the oil-producing industry to behave as other than a highly competitive industry under a regime of universal unitization of oil reservoirs. Thus, there would be no economic basis on which to challenge universal unitization under state or federal antitrust laws. For an individual unit to restrict current production in the hope of getting a higher price in the future would be no more in restraint of trade than for an individual farmer to withhold beef or wheat from the current market in the same hope.

15 *United States v. Cotton Valley Operators Committee*, 77 F. Supp. 409 (W.D. La.), *aff'd per curiam*, 339 U.S. 940 (1948).

16 R. HARDWICKE, *ANTITRUST LAWS ET AL. V. UNIT OPERATION OF OIL AND GAS POOLS* (1948).

VIII. Conclusion

The concept of unitization of oil reservoirs for efficient recovery of oil is not new. There are hundreds of successful unit operations in the United States today,¹⁷ initiated by voluntary agreement of all or a large majority of the ownership interests in the affected reservoirs, usually for the purpose of secondary recovery in old fields. What this article proposes is new: The mandatory unitization of all reservoirs soon after discovery, this form of regulation substituting for all existing regulation (*e.g.*, of well spacing and production rates) save that designed to protect the environment.

This proposal would require legislation both to mandate unitization and to exempt unit operations from state and federal antitrust laws. To date, the several states have assumed jurisdiction over petroleum conservation regulation in areas other than upon federally owned lands. If this division of jurisdiction is soundly based in constitutional law, the burden of legislation must fall largely on the states although the federal government can exercise demonstrative leadership by acting with respect to the federal lands, particularly the outer continental shelf, which is believed to be rich in undiscovered oil and gas deposits. At the very least, the federal government can facilitate appropriate action at the state level by specifically exempting noncollusive unit operations from federal antitrust laws. It is the author's hope that the above discussion of the economics of the matter will serve as an invitation to members of the legal profession to address themselves to the related problems of law in achieving the goal of unitization.

17 According to the only published survey available, the number of units increased from 130 in 1948 to 1,550 in 1962. INTERSTATE OIL COMPACT COMMISSION, A STUDY OF CONSERVATION OF OIL AND GAS IN THE UNITED STATES, 1964, at 62 (1965). I estimate that the number has at least doubled since 1962.