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Oil Conservation in a New Setting

Wallace F. Lovejoy

OIL CONSERVATION IN A NEW SETTING*

WALLACE F. LOVEJOY†

I

THE CHANGED SETTING

The much maligned and misunderstood mechanism of state oil conservation is once again being criticized. While in the past the major critics have been those who have felt that this device creates a legalized cartel and unnecessarily high, albeit stable, prices,[1] today the criticism is coming more from within the industry than from without, and from regulatory authorities directly and indirectly concerned with the oil industry. There is, for example, a broad study of oil and gas conservation regulation currently being undertaken by the Interstate Oil Compact Commission (I.O.C.C.).[2] The Secretary of the Interior in a letter to the I.O.C.C. in the spring of 1963 voiced his concern over unsolved problems in conservation:

> The total crude supply available for domestic use is made up of domestic production and imports. The major component is domestic production which is subject to a supply control system based upon state statutes. Several factors have worked together to limit the effectiveness of their control system. Among these are the status of state regulatory statutes in light of present day technology, the limited participation of some producing states, and the increased flexibility of interstate purchasing and transportation facilities.[3]

An interagency committee on petroleum of the Federal Government added its voice in the concern:

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† Professor of Economics, Southern Methodist University, Dallas, Texas.

1. Rostow, A National Policy for the Oil Industry (1948); de Chazeau & Kahn, Integration and Competition in the Petroleum Industry (1959); Watkins, Oil: Stabilization or Conservation? (1937).

2. Report and Address of the Chairman of the Interstate Oil Compact Comm'n, Midyear Meeting, New Orleans, June 13-15, 1963.

3. U.S. Dep't of the Interior, Press Release setting forth letter from the Secretary of the Interior to Governor Matthew E. Welsh, Chairman of the Interstate Oil Compact Comm'n, April 4, 1963.

> It is now clear that several factors have seriously distorted the regulatory system and decreased its effectiveness to adequately serve either Federal or State objective.
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> It is recommended that the Secretary of the Interior be requested to undertake discussion with the [Interstate Oil Compact] Commission, looking toward the formation of a working group to consider objectively the problems involved in updating the control system.[4]

Individual regulatory authorities and industry representatives have issued numerous statements attacking what they consider to be defects in the existing system. A list of these statements includes pleas for well spacing regulations to eliminate the drilling of unnecessary wells, for more uniformity among states in proration formulas, for changes in proration yardsticks or depth factors in allowables, for more favorable or less favorable treatment of pressure maintenance projects in proration, for clarification of the role of "maximum efficient rates" of production (MER's) in proration, for compulsory pooling of drilling units, for compulsory unitization of producing units, for a system of "fair sharing" among producing states of the nation's total production, and for ratable-take regulations in gas production. The American Petroleum Institute recently issued a statement in which it noted the groundswell of discontent:

> To meet growing future requirements [for oil and gas]; continued progress in technology and operating practices will be needed *and substantial improvements in conservation practices and regulations will be imperative.*[5] [Emphasis added.]

It is quite clear that agitation for reform in oil and gas conservation today is probably greater than it has been since the early 1930's, when the foundations of modern regulation were laid.[6]

4. United States Petroleum Study Committee, A Report to the President 4-5 (1962) (mimeo.).

5. American Petroleum Institute, Statement of Policy: Conservation, Development and Production Practices 3 (1963).

6. The criticism of the conservation regulation system by academic economists has not ceased. See, *e.g.*, Davidson, *Public Policy Problems of the Domestic Crude Oil Industry*, 53 American Economic Rev. 85 (1963); *Comments* on this article by D. R. G. Campbell and by Henry Steele and Davidson's *Reply*, 54 American Economic Rev. 114, 119, 125 (1964); Adelman, *The World Oil Outlook* in Natural Resources and International Development (Resources for the Future, Inc., 1964); Adelman, *Efficiency of Resource Use in Crude Petroleum*, paper presented at the annual meeting of the American Economic Ass'n, Boston, December 29, 1963.

What has caused this new push for reform? Several factors seem to stand out. There is a growing realization that much of the oil produced in the United States is high cost relative to that produced in many other parts of the world. Being the high cost competitor in your own backyard market is always an uncomfortable position. It means that additional profits for domestic producers cannot come from higher prices but rather must come either from cost savings or from recapturing, through a tighter import control system, part of the domestic market which is now supplied from foreign sources. Related to this is the realization that no individual state is the "balance wheel" in equating domestic supply and demand, which, as Erich Zimmermann argued, was the role Texas played until recently.[7] Oil imports are probably the closest thing to a balance wheel in the domestic industry, and these controls are set by the President with no legislative limitations.[8] The price ceiling implications of this situation are obvious and are made firmer by the presence of oil shale which threatens to become a serious competitor in the near future.

Adding to the price-cost dilemma is the problem of domestic "excess producing capacity." In 1960 the National Petroleum Council (N.P.C.) estimated that, for the nation as a whole, 12,383,000 barrels per day of crude oil and natural gas liquids could be produced, while production itself was running at about 8,353,000 barrels per day.[9] The fact that the major "market demand" states are currently producing prorated wells at far below efficient capacity rates is concrete evidence of the overcapacity situation. The overcapacity situation is complicated by the fact that the ratio of current production to proved reserves has remained relatively constant while producing capacity has been rising.

Herein lies the nub of the current problem of conservation regulation reform. One unnamed state regulator summed this up neatly in a comment that went something like this:

7. Zimmermann, Conservation in the Production of Petroleum 213-26 (1957).

8. The Trade Agreements Extension Act of 1958 (Reciprocal Trade Agreements Act) P. L. 85-686, §§ 3, 8(a), 72 Stat. 673, 678 (1958), as amended, P. L. 87-794, § 257, 76 Stat. 881-2 (1962), 19 U.S.C. §§ 1351, 1352a (Supp. V, 1964), gives the President the power to set any import level he thinks is necessary to achieve the objectives of the Act. Adequate petroleum supplies and reasonable consumer prices are among the prime objectives. The Act places no absolute barrel limitations and no limitation such as a percentage of the domestic market on imports. See also Trade Expansion Act of 1962, P.L. 87-794, §§ 101-258, 76 Stat. 872-83 (1962), 19 U.S.C. §§ 1801-88 (Supp. V, 1964).

9. Most of the excess capacity is in Petroleum Administration for Defense District 3: Texas, Louisiana, New Mexico, Mississippi, Arkansas, and Alabama.

> The drastic market demand restrictions of the degree we have had to make in the past two years underlie most of our problems. Some operators feel they are being treated unfairly and suggest changes. These suggested changes are objected to by others who claim that they will then be treated unfairly. When everyone produces at near capacity no one complains very much. When the market is slack everyone blames the other fellow.

Since the domestic producing industry appears destined to have considerable excess producing capacity for many years to come (barring an emergency situation which severely restricts imports), the industry as well as many regulatory authorities are calling for adjustments in conservation regulations to fit the new situation. The existing regulations operate fairly effectively in the context of demand nearly equalling production at rates restricted only by efficiency considerations. The major evils sought to be corrected by these regulations were: (1) unrestrained production, which caused both underground and above-ground waste, and (2) drainage caused by non-ratable production. New regulations are needed which operate in a context of demand substantially less than production at efficient rates, and which still accomplish the conservation goals of preventing unnecessary waste and protecting correlative rights in the field.

The following discussion will attempt to outline some of the areas in which the new set of circumstances threatens to make existing patterns of regulation obsolete. The regulatory experience of Texas will be used primarily in the discussion, although much of what is said can be broadly applied to most states. Some tentative suggestions will be made for bringing regulation out of the past and making it more effective in the new circumstances. These comments are made with the clear realization that there is no easy solution which will not hurt someone, and that any solution will be painfully slow in coming.

In any industry which has been regulated for an extended period, a group of institutions and practices evolve based, among other things, on the regulations. The current posture of the industry is a product of its history. This is often overlooked by critics who propose radical changes. The behavior of individuals and companies is conditioned by the "rules of the game," and more importantly, such behavior is a continuum over time involving decisions today based on expectations that existing institutions and regulations will

not change greatly in the future. Once an industry has been built, based in part on a set of regulations, it becomes exceedingly difficult politically and economically to change. If changes in regulations are to occur, they must be made at some point in time; yet any time, from someone's viewpoint, will be the wrong time. If oil wells were fully depleted in six months, or if investments were paid out in this industry in a year or so, the transition could be made much more easily. This is not the case, however, and there cannot be a moratorium on all activity in the industry so that it can, in a sense, start over. It is far easier to build an ideal structure of regulations where none exists than it is to build a new structure in a situation in which an old structure must first be torn down. And it is difficult to salvage the good parts of an old system to put them in a new one, since the parts are designed to fit together in a workable whole.

II

OVERCAPACITY AND PRORATION

While this is not the place to examine the question of the extent and location of overcapacity in oil production in detail, it is necessary to show that this poses a serious problem which is apt to be long run rather than short run in nature. We are concerned here particularly with the major oil producing states which practice "market demand" proration.[10]

The demand for energy in the United States during the post war years has grown at a rapid rate, but not all types of energy have shared equally in this growth. Competition among fuels in several major markets has resulted in shifts among fuel users. Coal clearly has been hit hardest with the loss of most of its heating and railroad fuel markets and a shrinkage in its industrial market. Fuel oil consumption has grown slowly because of competition from natural gas. Crude oil has also experienced market losses to natural gas liquids for refinery feed stocks. Coupled with this domestic competition, United States oil producers have lost their dominant world position, and this country has switched from a major oil exporting nation to a major oil importing nation. The 1962 United States demand for liquid hydrocarbons was about 10,234,000[11] barrels daily. This was supplied from the following sources: domes-

10. This term is used to describe a regulatory system which restricts output to estimated consumption.

11. *Table I* to U.S. Bureau of Mines, 1962 Annual Petroleum Statement (1963).

tic crude oil, about 70 per cent; domestic natural gas liquids, about 10 per cent; and imports of crude oil and products, about 20 per cent.

Despite early signs of this overcapacity situation, domestic companies rapidly expanded their exploratory and development efforts in post war years so that in January, 1951, the N.P.C. reported producing capacity for crude oil and gas liquids at 7,300,000 barrels daily, and by 1960 this had risen to 12,383,000 barrels daily.[12] Producing capacity and actual production for 1960 by P.A.D. Districts is shown in Table I. The major area of excess capacity is found in District III—including Texas, Louisiana, New Mexico and Mississippi.

This fact is also borne out in state producing rates. Texas is currently producing its "prorated wells"[13] at a rate of about 28 per cent of their schedule daily allowables, Oklahoma is producing its allocated wells at about 30 per cent, and Louisiana is producing at about 33 per cent of its depth-factor allowables. In every case these percentage figures overstate the degree of restriction because the prorated wells could not produce their full allowables on a sustained basis. However, even allowing for a 50 per cent understatement of the production rate to true efficient capacity, the degree of restriction is severe.

This overcapacity will not disappear overnight or even in a few years. If we postulate a "normal" decline in producing capacity of 8 per cent per year of all wells currently in existence with no new wells drilled, and imports remaining at about current levels, it would probably take about 4 or 5 years for capacity to decline to a level equal to current demand for domestic oil. As long as new drilling adds new capacity as fast as old capacity is declining, we must rely on growth in the demand for domestic oil to reduce excess capacity. If it is assumed that new drilling maintains the current level of capacity, and demand for domestic crude oil is growing at from 1½ to 2½ per cent a year, this means it would take at least 15 years for demand to catch up with the *current* level of producing capacity. To the extent that new drilling adds to existing capacity, net of the natural decline, the time required for growth in demand to absorb the excess capacity is lengthened.

12. *Table 6* to National Petroleum Council, Petroleum Productive Capacity (1952); National Petroleum Council, Proved Petroleum and Natural Gas Reserves and Availability 4 (1961). Data for Natural Gas Liquids in 1960 are somewhat overstated compared to the 1951 data due to changes in definitions.

13. This term will be fully discussed *infra*.

The state restrictions noted above do not fall equally on all producing wells in a state, but rather they fall almost entirely on the relatively flush or prolific wells. Thus one hears cries of anguish from operators of these wells claiming that regulation discriminates against them. At 80 to 90 per cent producing rates, these cries would be rarely heard. Let us look at Texas in some detail to determine precisely how the system works in allocating production among classes of wells and pools within the state.

TABLE I

UNITED STATES CRUDE OIL PRODUCTIVE CAPACITY[14] AND PRODUCTION[15]

(THOUSANDS OF BARRELS DAILY)

P.A.D. District	Productive Capacity Jan. 1, 1960	Production Average for 1959 & 1960	Excess Production	Production as per cent of Capacity
1	29	29	0	100.0
2	1,555	1,334	221	85.8
3	7,331	4,168	3,163	56.9
4	664	672	—8	101.2
5	1,006	842	164	83.7
Total U.S.	10,585	7,045	3,540	66.6

The Texas system divides wells into exempt and non-exempt categories. The exempt categories include the following:

(1) *Discovery wells* which have special "yardstick"[16] allowables depending on depth, but which are exempt from market demand restrictions. Oil wells drilled in a new field or pool can produce this special allowable until the sixth well has been completed or for eighteen months from the time the initial well is assigned an allowable, whichever occurs first.[17]

(2) *Marginal wells* are defined as marginal by statute[18] and are entirely exempt from production restrictions. A well producing 10

14. From *Table IV* to National Petroleum Council, Proved Petroleum and Natural Gas Reserves and Availability (1961).

15. From *Table 4* to U.S. Bureau of Mines, *Crude Petroleum and Petroleum Products: 1960*, Annual Petroleum Statement No. 473 (1961) (mimeo.).

16. The term "yardstick" is explained *infra*.

17. Railroad Comm'n of Texas, Special Order No. 20-29, 540, effective June 1, 1954.

18. Tex. Rev. Civ. Stat. art. 6049b (1948).

barrels per day or less from a depth of 2,000 or less is marginal; as is a well producing 20 barrels per day from 2,000 to 4,000 feet, or 25 barrels per day from 4,00 to 6,000 feet, or 30 barrels per day from 6,000 to 8,000 feet, or 35 barrels per day from over 8,000 feet. Entire fields may be marginal, or a flush field may have a few marginal wells.

(3) Wells in *capacity water flood* (secondary recovery) projects are usually allowed to produce at capacity with no market demand restrictions. Also, the *"County Regular" fields* are not restricted. These are small, relatively shallow fields in Railroad Commission Districts 7B and 9 (North Central Texas) which often produce at rates high enough to disqualify them from the marginal well category but at rates substantially below the "yardstick" allowable usually applied to non-exempt wells. These fields are considered to be in the stripper category and thus exempt from production restrictions. In addition there are a few other minor categories of exempt wells. The term "marginal" may be properly applied to statutory marginal wells, wells in capacity water flood projects, and wells in "County Regular" fields.

The remaining wells in Texas are subject to market demand restrictions. This includes fields with pressure maintenance projects, although such projects are usually given a bonus allowable related to the amount of water or gas injected. After a new field goes off the discovery allowable, it is given a "yardstick" allowable. The "yardstick" is set forth in Table II. This sets the maximum schedule daily allowable that can be produced for fields of various depths drilled on different spacing patterns. Some fields get special exceptions granted in determining allowable because of special conditions. These may be lumped together and labelled M.E.R. allowable fields. The market demand percentage is then applied to the yardstick or M.E.R. allowable to determine how much a field can produce in a given month. Thus, a 4,000 to 5,000 foot well on forty-acre spacing with a 28 per cent market demand factor can produce about 26 barrels per day ($92 \times .28 = 26.04$) according to the "yardstick." The fact that a statutory marginal well at this depth may produce up to 25 barrels per day is sufficient to indicate why operators of flush wells often feel treated unfairly.

In April, 1963, production in Texas from exempt wells was as follows:[19]

19. Records of the Railroad Comm'n of Texas.

Discovery Wells	112,821 BD
Marginal Wells—Statutory	412,260 BD
Others—Capacity Water Floods, County Regular Fields, Etc.	688,772 BD
Total Exempt Production	1,213,853 BD

The remaining wells in Texas which were subject to market demand restrictions had a schedule daily allowable of about 5,734,481 barrels per day, based primarily on the yardstick, *i.e.*, this would be the theoretical maximum allowed production with no market demand restriction.[20] It is difficult to determine accurately what the sustainable productive capacity for these wells is, but it is probably in the range of from 3,650,000 to 3,700,000 barrels per day. In April, 1963, the total state allowable production of exempt and non-exempt wells was about 2,819,000 barrels per day, of which 1,214,000 barrels per day came from exempt wells. This left wells capable of producing about 3,700,000 barrels per day actually producing about 1,605,000 barrels per day or at about 43 per cent of true efficient capacity.

It is situations such as this, for which producers see no hope in the near future for improvement, that cause much of the unrest and dissatisfaction with the current regulatory framework. The regulatory authorities are restive also because they feel caught in an uncomfortable and unpopular position from which escape seems hopeless. What, if anything, can be done at the state level to bring "fairer" treatment of all groups regulated, and what can be done to ease pressures caused by delayed revenues from stretched out production?

III

POSSIBLE CHANGES IN PRORATION REGULATION IN TEXAS

It should be pointed out at the outset that a state commission in attempting to deal with the overcapacity problem can work only with supply; it has little if anything to do with demand. It should also be noted that each state in manipulating its own supply works

20. Some flush fields are allocated by special order of the Commission on the basis of maximum efficient rates of production rather than the yardstick. It is impossible to separate the amount of production of fields using the M.E.R. basis from fields using the yardstick. Also, the big East Texas Field, except for statutory marginal wells in the field, produces under a special order which is not based on the yardstick.

TABLE II

THE TEXAS 1947 YARDSTICK[21]

Daily Schedule Allowable (Barrels)

Depth (feet)	10-Acre Units	20-Acre Units	40-Acre Units
0- 1,000	18	28	
1,000- 1,500	27	37	57
1,500- 2,000	36	46	66
2,000- 3,000	45	55	75
3,000- 4,000	54	64	84
4,000- 5,000	63	73	93
5,000- 6,000	72	82	102
6,000- 7,000	81	91	111
7,000- 8,000	91	101	121
8,000- 8,500	103	113	133
8,500- 9,000	112	122	142
9,000- 9,500	127	137	157
9,500-10,000	152	162	182
10,000-10,500	190	210	230
10,500-11,000		225	245
11,000-11,500		255	275
11,500-12,000		290	310
12,000-12,500		330	350
12,500-13,000		375	395
13,000-13,500		425	445
13,500-14,000		480	500
14,000-14,500		540	560

in the context of all other producing states, some of which have overcapacity also. Several alternatives come to mind for a state such as Texas.

One alternative might be to increase allowables on restricted production even though the market demand does not seem to warrant it. This has at least two possible repercussions distasteful to almost everyone in the industry. Buyers would probably institute "purchaser proration" which may result in the same amount of oil being taken as before, but now under purchaser restriction or proration rather than state restriction. Such a system is susceptible to abuse and can easily result in discrimination by purchasers among

21. From Rule 45(A), Recompilation of Rules and Regulations for the Railroad Comm'n of Texas, Oil and Gas Div., 1963 Statewide Rules.

producers within fields and among fields which would be difficult to detect and police. A second possible effect would be a price reduction for crude oil in the field. With allowed production in excess of demand, there would probably be downward price pressures that would be difficult to resist. Such pressures might originate on either the buying or the selling side. The temptations to shave prices in a surplus situation are considerable. If prices did drop, it might very well happen that when prices once more stabilized many producers would be selling little or no more crude oil but at lower prices. Perhaps a longer run effect of lower prices would be to drive some marginal production out of business and thus make more room for additional flush production. It is apt also to slow down investments in pressure maintenance and secondary recovery projects which are being contemplated. None of these results is likely to be looked upon with favor by state regulatory authorities or by the industry. Nor is it clear that the public would benefit in the long run.

Another alternative might be to start applying some restrictions to exempt wells so that they share the burden. For example, the statutory definition of marginal wells could be changed, which would take some production out of this category. The same could be done for County Regular fields and capacity water flood projects in the state. There are many marginal wells, including wells in the County Regular or capacity water flood fields, that produce enough oil to more than cover their costs of production plus a reasonable profit. They are, in other words, far above a break-even point of production. A possible solution would be to repeal the statutory definition of marginal wells and leave to the discretion of the Commission the level of production which is to be allowed from the wells that are currently in this category. The criteria for an allowable under this system would be economic, *i.e.*, how much production is needed in a field or well to generate sufficient revenues to cover the costs of operating the field or well and yield a reasonable profit. Cost and revenue determinations would have to be made for each field or each well. In the case of fields made up entirely of marginal wells (in the broad meaning of this term), the economic determinations should be on a field basis. This would require unit operations of the field, which in itself is a major stumbling block to adopting any such system. For marginal wells in flush fields, the economic determinations would have to be on an individual well basis.

The flexibility in this suggested change would enable the Com-

mission to keep alive the marginal wells but would permit the Commission to force these wells to bear some of the restriction caused by overcapacity. It would have the beneficial side effect of eliminating what are currently clear cases of legalized drainage of neighboring properties by marginal wells in flush fields. There exist today situations in which marginal wells in flush fields are allowed, by statute, to produce more than neighboring non-marginal wells subject to market demand restriction. The result is quite often that the marginal well recovers far more oil than the original recoverable reserves in place under the marginal well lease.

A less drastic change would be to adopt a system similar to that used in Oklahoma. Oklahoma regulations allow marginal wells to produce no more than the lowest allowable for restricted wells. Thus, if the lowest allowable on prorated wells is 8 barrels per day with a market demand restriction of 30 per cent of the top well allowable, which was the case in the summer of 1963, no marginal well could produce in excess of 8 barrels daily. If the market demand restriction eased so that the lowest allowable was 10 barrels daily, the top allowable for marginal wells would rise to 10 barrels daily.[22]

On the other hand, the sort of system suggested above which leaves marginal well production to the discretion of the Commission would involve the Commission in cost analysis to a far greater extent than is now undertaken. The Commission would be loathe to add this tremendous task to its already overworked staff. Possible litigation under this system might be staggering. Also, it would require legislation that would be unpopular with large numbers of operators and royalty owners so that the political forces opposing it would have an excellent chance of defeating such a proposal. Yet, some restriction of marginal well production is certainly called for.

Some changes could also be made in discovery allowables which might free production for non-exempt wells. The existing regulations have a yardstick for discovery wells based on depth but with no adjustments for different well-spacing patterns. This yardstick is roughly comparable to the yardstick for forty-acre spacing for non-

22. The Oklahoma Rules provide that "The maximum per well allowable for unallocated pools shall be equal . . . to the basic minimum allowable for allocated pools . . . and shall be subject to market demand fluctuation upon the same basis as the minimum allocated pool allowable . . . ." Rule 303-2-A, Corporation Comm'n of Oklahoma, General Rules and Regulations, as amended (1961).

exempt wells.[23] It might be feasible to make the discovery well yardstick double what it currently is at all depths, but apply the market demand factor to these wells. This would probably reduce incentives for exploration. Production from exploratory wells would feel market demand fluctuations. The amount of production transferred would not be great since discovery wells produce only about 100,000 to 150,000 barrels daily. However, such a system would have the added benefit of providing smaller incentives for discovery at times when market demand restriction was greatest and thus at times when additions to productive capacity are least desirable.

Whether any state would ever want to dampen discovery efforts intentionally is doubtful. Also, any attempt to reduce a given state's producing capacity might backfire in that it might merely mean a reduction in that state's market demand to the benefit of neighboring states. In such a situation the cuts in exempt production might very well be partially transferred out of state rather than to the non-exempt production within the state. For example, pipelines connected to County Regular fields in North Central Texas might take oil from Oklahoma fields if production in the County Regular fields were reduced. It is conceivable that co-operation among neighboring states could prevent such shifts between states, and allow the cuts in exempt-well production to accrue to non-exempt wells in each state. Past experience indicates that co-operation of this sort would be difficult to achieve, since it would require a substantial uniformity of regulations among states. It is conceivable, however, that this could occur, and the Interstate Oil Compact Commission could very well be the vehicle for achieving the desired uniformity.

IV

OTHER AREAS OF POSSIBLE REFORM

A completely different line of attack is open to the states which does not go directly to the overcapacity problem but which could improve the health of the industry within each state. This is an attack on the cost problems of the industry through changes in such things as well-spacing requirements, proration formulas, unitization and pooling requirements, and the like. This approach is already

23. The discovery well yardstick is lower than 100 per cent of the regular yardstick for wells under 4,000 feet, greater for wells from 4,000 to 10,000 feet, and less for wells over 10,000 feet.

being tried piecemeal in several states. Recently collected data reveal three significant trends:[24] (1) well spacing in new fields is getting wider and wider with 40-acre units becoming the minimum size in some states and with 80-acre and even 160-acre drilling units for oil becoming more and more common; (2) proration formulas for new fields are de-emphasizing the well factor and are moving toward 100 per cent acreage and in some instances 100 per cent acre feet; (3) while there have been relatively few changes in compulsory unitization regulations and their application (except in Louisiana where such a law was adopted in 1960), there is an obvious trend toward voluntary unitization and pool co-operation among operators. These are all encouraging signs which, given time, will help reduce unnecessary drilling in new pools and will help reduce costs or at least keep them from being as high as they otherwise might be in these new pools. They will not, however, put a significant dent in excess producing capacity and will not, in themselves, alleviate the pressing problem of heavy production restrictions on existing wells. They should be urged, however, for the simple reason that they will eventually put producers in a better position to weather what seems to be an inevitable cost-revenue squeeze in the future.

Certain changes along the lines noted above would not only result in a significant future cost saving to the industry as a whole, but would also help to eliminate what appear to be inequities in the present system which often become accentuated during periods of severe market demand restrictions.

Part of the well-spacing problem in Texas appears on the way to being solved. Under present regulations the Railroad Commission has the power to suggest, but cannot require, drilling units in situations involving small tracts.[25] Under Rule 37 anyone wishing to drill on acreage less than the size of the suggested drilling unit

24. This information is from preliminary data gathered by the Interstate Oil Compact Commission's Governors' Study Committee (Efficiency Study Committee) and will be reported in detail in the findings of this committee, scheduled for release in December, 1964.

25. Rule 37 of the Texas Railroad Commission establishes 40 acres as the statewide spacing rule, but it also provides (1) that the Rule shall not apply to salt dome fields and (2) that owners of leases on "small tracts" are allowed to drill a well as an exception to Rule 37 if the tract is part of a subdivision set up before the general spacing order went into effect in the specific area concerned. However, under Rules 38, 39, 40 and 45, the Commission has the power to establish proration or production units and to set allowables for each such unit. Railroad Comm'n of Texas, Recompilation of Rules and Regulations for the Railroad Comm'n of Texas, Oil and Gas Div. (1964).

may do so. Until recently such an operator could expect a special allowable which would enable him to recover his investment and a fair return. With the *Halbouty, Atlantic, Shell*, and *Alcoa* decisions in the Texas courts,[26] the small tract operator can expect an allowable which will enable him to recover only the oil or gas under his tract, regardless of whether this allowable enables him to pay for his well. These decisions appear to assure passage of a compulsory pooling bill in the next session of the Texas Legislature, and such a bill now seems to have the backing of the Texas Independent Producers and Royalty Owners Association (TIPRO) and the Committee for Equitable Development of Texas Oil and Gas Resources (CEDOT), two powerful groups of independent oil operators. A compulsory pooling law is essential to prevent the drilling of unnecessary wells. It is also important to assure the small tract owner of his fair share of oil and to assure the large tract owner of protection from drainage by the small tract well.[27] All major producing states except Texas, California, and Kansas have laws for compulsory pooling of drilling units.

There also appear to be encouraging signs in establishing wider well spacing for new fields. Temporary spacing orders for 320 acres have been issued in Texas, and 160-acre spacing is no longer a rarity. Louisiana, New Mexico, and Oklahoma are doing much the same thing. This type of spacing early in the life of a field is especially appealing because infill drilling can be done if it is later decided that closer spacing is the optimum pattern. Wells can never be "undrilled," but they can always be drilled.

Another powerful deterrent to excessive drilling that can be used by a regulatory commission is an allocation formula based on 100 per cent acreage or 100 per cent acre-feet of recoverable reserves. This tool was mentioned above in connection with compulsory pooling of drilling units. The various regulatory agencies have in recent years, been giving less and less weight to the number of wells on a producing unit for setting allowables, but there is still much to be done in this area. For example, the "1947 Yardstick" which is used in Texas to establish schedule daily allowables, found in Table II,

26. Halbouty v. Railroad Comm'n, 163 Tex. 417, 357 S.W.2d 364 (1962), *cert. denied*, 371 U.S. 888 (1962); Atlantic Ref. Co. v. Railroad Comm'n, 162 Tex. 274, 346 S.W.2d 801 (1961); Railroad Comm'n v. Shell Oil Co., 369 S.W.2d 363 (Tex. Civ. App. 1963); Railroad Comm'n v. Aluminum Co. of America, 368 S.W.2d 818 (Tex. Civ. App. 1963).

27. See Hardwicke & Woodward, *Fair Share and the Small Tract in Texas*, 41 Texas L. Rev. 75 (1962), for an excellent discussion of the small tract problem in Texas.

gives larger allowables to wells on wider spacing patterns at any given depth and also larger allowables to wells of greater depth on any given spacing pattern. The 10-acre pattern is the basic allowable for any depth; one barrel per additional acre is added for wider spacing. If a yardstick system is to be used, in order to be more consistent with conservation philosophy, larger than 10-acre spacing should be accorded the proper multiple of the basic allowable—20 acres having a multiple of two, 40 acres a multiple of four, and so on. The Texas Commission currently has its yardstick under review with an eye toward giving more weight to the acreage factor.

The final aspect of conservation regulation which should be mentioned is unit operations of producing units. For a number of years petroleum engineers have known that more oil can be recovered at lower costs if a pool can be produced as a single unit rather than on a fragmented lease basis. Virtually all states have voluntary unitization regulations to allow operators to join their properties by mutual agreement. Oklahoma, Louisiana and five other less important states have "compulsory" unitization laws which provide for unit operations to be ordered by the regulatory body.[28] Unit operations, both voluntary and compulsory, are of growing importance in the drive to cut costs and increase ultimate recovery. Some progress has been made in all states in this direction. However, there is much left to be done, and compulsory unitization laws are probably a necessity. There is understandable reluctance, particularly among small operators, to place in the hands of regulatory bodies the decisions on shares of costs and production from unit operations. Rightly or wrongly, many operators feel that such a system would not give them their "fair share," or more accurately perhaps, that the commission's concept of fairness might differ from

28. The statutes of the several states vary as to the specific form compulsory unitization takes. Alabama [Ala. Code tit. 26, § 179(73) (1958)], Arkansas [Ark. Stat. Ann. § 53-115(C-1 to -17) (Supp. 1963)], and Louisiana [La. Rev. Stat. § 30:5(C) (Supp. 1963)] require that the royalty and working interest owners of 75 per cent of the area to be unitized agree to the unit plan. Oklahoma [Okla. Stat. Ann. tit. 52, § 287.5 (Supp. 1963)] requires that the owners of 63 per cent of the area agree. Florida [Fla. Stat. § 377.28 (1960)], Michigan [Mich. Stat. Ann. § 13.139(13) (Supp. 1963)], and Washington [Wash. Rev. Code §§ 78.52.330—.460 (1961)] merely give the regulatory authority the power to require unitization to prevent waste without specifying the degree of acceptance by the ownership interests involved. Louisiana also provides that the Commissioner of Conservation can unitize for cycling purposes gas-condensate fields without the consent of any ownership interests [La. Rev. Stat. § 30:5(B) (1950)]. Compulsory unit operations are significant only in Oklahoma, Louisiana, and Arkansas.

the operator's. This is a danger which is ever present in all types of commission regulation. Such arguments are not adequate to justify an absence of regulation in a particular area, if it can be shown that the lack of regulation is resulting in substantial social costs, as seems to be the case in situations in which there is oil "wasted," *i.e.*, not recovered, because of failure to unitize. It should be noted that there are substantial legal problems encountered in attempting to write a compulsory unitization law for yet-to-be-developed properties.

CONCLUSION

The state authorities charged with shaping and administering oil conservation regulations are faced with a situation today for which no easy solutions can be found. In fact, it is likely that there exist no truly adequate solutions at all. If all the changes in regulations suggested here were made, and this seems highly unlikely if not an impossibility, would we then have solved our problems? The answer must be an emphatic no. The best that can be said for these reforms is that they would start us in the right direction so that conservation goals would be better achieved *in the future* than is true currently or in the recent past. It is impossible to escape the overcapacity situation which is a product of the past. It is difficult, if not impossible, to have proper well spacing or proper allocation formulas in fields which have already been developed. These things can only be achieved in fields developed in the *future*. Overcapacity will be with us for many years to come. In this we have no choice. We do have some choice in how the burdens created by overcapacity will be borne; and we do have some choice in how future producing capacity will be developed. It is in these areas that the challenges to regulators lie.