The Statutory Depletion Allowance and it's Relationship to Reserves, Production Rates, and Operating Conditions

By ARLEN L. EDGAR, ROBERT B. CONAWAY and JACK C. FIKES
Leibrock, Landreth, Cambell and Callaway
Consulting Petroleum Engineers

Prior to the enactment of the Revenue Act of 1913, exploration budgets were predicated on geology without regard to tax consequences. Since that time, more than 40 revenue bills have been passed by Congress, and it can be categorically stated that today the principal influence upon discovery and development of new reserves of crude oil is, and has been, our tax structure. Within this framework, there have been, over the years, 2 powerful stimulants to exploration. These are the provision that permits an election to expense intangible development costs and the provision to take percentage depletion above and beyond the recovery of capital investment.

Both of these provisions, in one form or another, have been written into our tax laws for almost 50 years. While the provision to expense intangibles has been the subject of its share of criticism over the years, the more controversial of the 2 has been, and continues to be, the allowance for percentage depletion, and is the subject of this presentation.

The present rate of percentage depletion allowable, which is 27-1/2%, has prevailed for 38 years, being established in the Revenue Act of 1926, and was restricted then, as it is now, by the 50% of net income limitation, which provision has been a part of our tax laws since 1924. Prior to 1924, the percentage depletion allowable was practically unrestricted. In attempting to determine the intent of Congress at the time, it might seem that depletion allowables were intended to be nothing more than a return of capital, or appreciated capital, due to exhaustion of a wasting asset, since there was incentive enough in the prolific strikes of that era, and the tax structure of the early '20s was scarcely a deterrent in itself. But, today, whether depletion is justified as an incentive to exploration or a recovery of a wasting asset above and beyond actual capital investment are academic questions.

When we talk about depletion, we are talking about either cost depletion or percentage depletion, and the depletion allowable is the higher of the 2; there is no choice. When we talk about percentage depletion, we are accustomed to thinking of 27-1/2% of gross income. This is a maximum. Under the 50% of net income limitation and the calibre of reserves for today's discoveries, the annual average depletion percentage is considerably below the 27-1/2% maximum. This average is certainly not an index of the tax benefits available through percentage depletion, because the application of percentage depletion is dependent upon the relationship between capital investment and gross and net income of a given company in the industry. This is a basic relationship to which all operators are subjected. The purpose of this paper is to set forth additional factors that have a bearing on the utilization of the depletion allowance among various operators under conditions that prevail in the industry today. These include quantity of reserves, crude price, operating costs, and the influence of producing rate restrictions.

The subject paper presents results of 3 hypothetical examples which illustrate the effect of reserves, producing rates and certain operating conditions upon actual allowable depletion. In establishing the hypothetical conditions, several simplifying assumptions were made as follows:

(1) All intangible development costs are written off at the end of a given calendar year prior to commencement of production and are not involved thereafter.
(2) The straight-line method of determining depletion is followed.
(3) The net working interest is 7/8 of gross production.
(4) The crude price, production taxes and operating expenses remain constant over the life of the property.
(5) The logarithm of the capacity producing rate of each hypothetical well is a straight-line function of cumulative oil production, thus yielding a harmonic decline trend.
(6) Initial producing rates are determined by allowable restrictions rather than by producing capacity.

Results for 3 examples are presented and a fourth case investigated is discussed briefly.

Example 1 involves a lease containing 160 acres, located in Texas. The estimated ultimate recovery is 2,000 bbl. per acre with recovery independent of development density. It is assumed the operator of this lease is contemplating development of 40, 80 and 160 acres per well spacing with resulting 1947 Texas yardstick depth bracket allowables. A summary of assumed data for this example is presented in Table 1-A. The question of development density to be undertaken is frequently encountered in the oil industry. Ordinarily, in resolving a question of this nature, the primary consideration (other than reserves) is that of producing rates and, hence, the effect of present worth of future income. One area probably not investigated in such an instance is the effect of allowable depletion for the development densities considered. Calculated producing rates as a function time for the three cases under Example I are shown on Fig. 1. These producing rates were calculated from harmonic decline curves which results in the "flattening" trends shown. These trends are believed to be representative of actual decline trends.

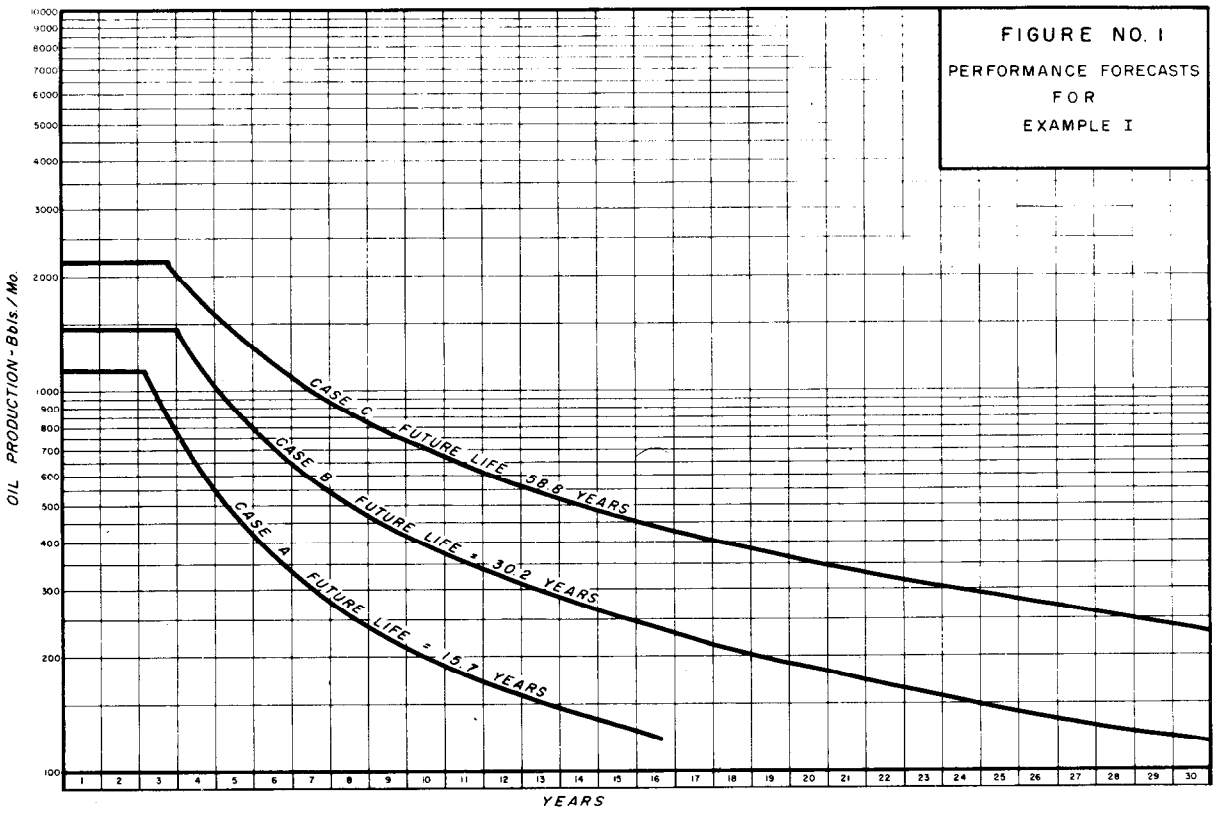

TABLE NO. 1-A

SUMMARY OF ASSUMED DATA
EXAMPLE I
VARIOUS DEVELOPMENT DENSITIES AND
CORRESPONDING 1947 TEXAS YARDSTICK ALLOWABLES
FOR A HYPOTHETICAL 160 ACRE LEASE

Well Depth, Feet		8,500
Ultimate Oil Recovery, Bbls:		
Lease		320,000
Per Well:	Case A - 40 Acre Spacing (4 Wells)	80,000
	Case B - 80 Acre Spacing (2 Wells)	160,000
	Case C - 160 Acre Spacing (1 Well)	320,000
Top Per Well Allowable Rate, Bbls/Month:		
	Case A - 40 Acre Spacing	1,130
	Case B - 80 Acre Spacing	1,470
	Case C - 160 Acre Spacing	2,160
Economic Limit, Bbls/Month		120
Well Cost, $		
	Tangibles	45,000
	Intangibles	80,000
	Total	125,000
Gross Crude Price, $/Bbl		3.00
Operating Costs, $/Month		300

Results of the investigation are summarized on Table 1-B. As shown, the allowable depletion for the producing life was 20.0, 21.7 and 22.9% of gross income respectively for the 40, 80 and 160 acres per well spacing cases. The range between allowable depletion for each of these cases is relatively small and it can probably be concluded that consideration of allowable depletion is not a major factor when considering development density.

TABLE NO. 1-B

SUMMARY OF RESULTS
EXAMPLE I

Case	Allowable Depletion % of Gross Income
A	20.0
B	21.7
C	22.9

Example II involves comparison of allowable depletion for a given well in Texas, assuming ultimate recoveries of 1,000, 2,000, and 3,000 bbl. per acre. Assumed data for this example are summarized on Table 2-A. Fig. 2 contains forecasts of oil producing rates versus time for the three cases involved in Example II. These trends were also calculated from harmonic decline plots. Results of calculations for Example II are shown in Table 2-B. Allowable depletion ranged from 20.6 to 22.9% of gross income for ultimate recoveries in the range of 1,000 to 3,000 bbl. per acre.

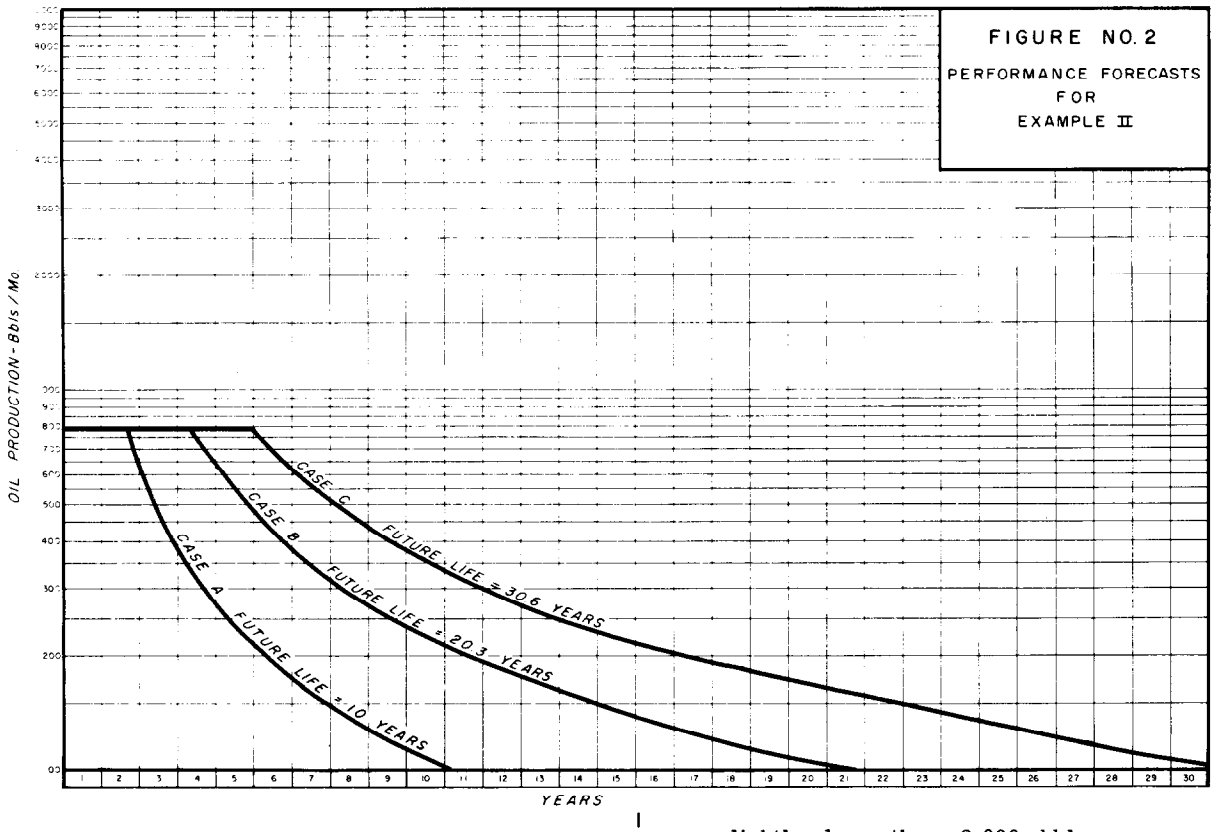

FIGURE NO. 2

PERFORMANCE FORECASTS FOR EXAMPLE II

TABLE NO. 2-A

SUMMARY OF ASSUMED DATA
EXAMPLE II
VARIOUS ULTIMATE RECOVERIES FOR A HYPOTHETICAL WELL

Well Depth, Feet	4,500
Spacing, Acres/Well	40
Ultimate Oil Recovery, Bbls:	
Case A @ 1,000 Bbls/Acre	40,000
Case B @ 2,000 Bbls/Acre	80,000
Case C @ 3,000 Bbls/Acre	120,000
Top Allowable Rate, Bbls/Month	790
Economic Limit, Bbls/Month	100
Well Cost, $:	
Tangibles	20,000
Intangibles	30,000
Total	50,000
Gross Crude Price, $/Bbl	3.00
Operating Costs, $/Month	250

It is believed the situation represented by Example II is of considerable interest to operators in the Permian Basin area of West Texas and New Mexico in view of the trend of per acre reserves developed by newly discovered fields. For example, during the period 1953 to 1957, 536 new fields were discovered in the Permian Basin. Reserves developed in these new fields were slightly less than 3,000 bbl. per acre. This compares with an average reserve of 14,000 bbl. per acre for the 14 fields discovered in this area during the period 1923 to 1927. It is felt that a very substantial part of the reserves to be found in the future in the Permian Basin will fall within the range of 1,500 to 2,000 bbl. per acre. The significance of the trend toward discovery of lower per acre reserves is, in itself, readily apparent. The results shown on Table 2-B add another dimension to the extent that the low reserve properties are further penalized with respect to allowable depletion under our current tax structure.

TABLE NO. 2-B

SUMMARY OF RESULTS
EXAMPLE II

Case	Allowable Depletion % of Gross Income
A	20.6
B	22.1
C	22.9

Example III involves a situation frequently encountered in practice, that of adverse conditions involving a low crude price and high operating expenses. Often both of these adverse factors are due to one circumstance, namely production of extremely sour crude. This crude commands a relatively low price and often contributes to higher lifting costs by virtue of corrosion of well and lease equipment. In order to investigate the effect of these 2 factors, 2 hypothetical wells have been assumed. As shown on Table 3-A, the well in Case A produces sour crude with a reduced

price and relatively high operating costs. The well is Case B produces sweet crude with a "normal" price and relatively low operating costs. The gross producing rates utilized in calculating allowable depletion for Example III are the same as those for Example II, Case B, as shown on Fig. 2. Calculated allowable depletion under these cases is shown on Table 3-B. Whereas the well in Case B, producing under more favorable conditions realizes an allowable depletion of 25.3% of gross income, the well in Case A producing under adverse conditions, realizes only 20.0% allowable depletion. As in Example II, it can be seen that under the current depletion allowance provision, an additional burden is again placed upon the lower quality property.

TABLE NO. 3-B

SUMMARY OF RESULTS

EXAMPLE III

Case	Allowable Depletion % of Gross Income
A	20.0
B	25.3

TABLE NO. 3-A

SUMMARY OF ASSUMED DATA
EXAMPLE III
VARIOUS CRUDE PRICES AND OPERATING EXPENSES
FOR TWO HYPOTHETICAL WELLS

Well Depth, Feet	4,500
Spacing, Acres/Well	40
Ultimate Oil Recovery, Bbls	80,000
Top Allowable Rate, Bbls/Month	790
Economic Limit, Bbls/Month	100
Well Cost, $	
Tangibles	20,000
Intangibles	30,000
Total	50,000

	Case A	Case B
Gross Crude Price, $/Bbl	2.65	3.00
Operating Costs, $/Month	300	150

In addition to the 3 examples discussed above, a fourth example was investigated. This fourth case involved determination of the effect upon allowable depletion of varying top allowable producing rates for a fixed ultimate recovery. It was found that no appreciable difference in depletion allowance over the life of the hypothetical properties resulted from assuming different initial rates governed by allowables. The reason for this similarity of depletion allowables realized is the effect of the provision limiting depletion to 50% of net income. In each of the cases stated, the reserves to be recovered after the time the 50% net provision becomes applicable, are very nearly the same. The calculated allowable depletion for these cases was on the order of 21 to 22% of gross income.

A sample flow sheet showing calculation of allowable depletion for Example II, Case A, is presented as Table 4. This same procedure was followed for all of the cases investigated.

TABLE NO. 4

SAMPLE ALLOWABLE DEPLETION CALCULATIONS
EXAMPLE II - CASE A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
				Expenses - $					Depletion - $		
Year	Gross Oil Production Barrels	Net Oil Production Barrels (1) x 0.875	Gross Working Interest Income, $ (2) x $3.00	Production Taxes (3) x 0.05	Production Expense	Depreciation	Total (4)+(5)+(6)	Net Income, $ (3) - (7)	50% Net Income (8) x 0.50	27-1/2% Gross Income (3) x 0.275	Allowable Lesser of (9) or (10)
1	9,500	8,310	24,930	1,250	3,000	2,000	6,250	18,680	9,340	6,860	6,860
2	9,100	7,960	23,880	1,190	3,000	2,000	6,190	17,690	8,840	6,570	6,570
3	5,800	5,080	15,240	760	3,000	2,000	5,760	9,480	4,740	4,190	4,190
4	3,900	3,410	10,230	510	3,000	2,000	5,510	4,720	2,360	2,810	2,360
5	3,000	2,630	7,890	400	3,000	2,000	5,400	2,490	1,240	2,170	1,240
6	2,300	2,010	6,030	300	3,000	2,000	5,300	730	360	1,660	360
7	1,900	1,660	4,980	250	3,000	2,000	5,250	(270)	--	1,370	--
8	1,700	1,490	4,470	220	3,000	2,000	5,220	(750)	--	1,230	--
9	1,500	1,310	3,930	200	3,000	2,000	5,200	(1,270)	--	1,080	--
10	1,300	1,140	3,420	170	3,000	2,000	5,170	(1,750)	--	940	--
Totals	40,000	35,000	105,000	5,250	30,000	20,000	55,250	49,750			21,580

Calculated Allowable Depletion = $\frac{\$\ 21,580}{\$105,000} \times 100 = 20.6\%$

In reviewing the hypothetical examples, it was found that 3 distinct periods exist over the entire producing life of each property. These periods are described as follows:

(1) A period during which the statutory depletion allowance of 27-1/2% of gross sales applies.
(2) A second period during which the 50% of net income provision governs allowable depletion and a net "book" profit results in spite of deductions for depreciation.
(3) The third period occurs toward the end of the economic producing life of a given property. During this period, an actual net operating profit is realized; however, a net "book" loss is calculated due to deduction of depreciation, which is not an expense. During this third period, since no net "book" income is calculated, there is no depletion allowance realized. In other words, during this period of time, the depletion allowance is "lost". Of course, this so-called loss of depletion is of academic interest only since, with no reported net profit, there would be no income tax liability

The periods described above are readily identifiable on Table 4.

Results of the depletion allowance calculated for Examples I, II and III are summarized in graphical form in Fig. 3. It is interesting to note on Fig. 3 that depletion allowance realized in all cases is substantially less than the 27-1/2% statutory depletion allowance. It would seem that this type of information would provide ammunition for defending the current depletion allowance against those critics who advocate a reduction in the 27-1/2% statutory rate. In contrast, however, data have been published for certain actual producing properties which show realized allowable depreciation approaching the statutory rate, over a given period of time. This situation can result only if that portion of the producing life of the property under examination falls primarily within the first period described above. In practice there are believed to be only 2 instances in which an operator can realize allowable depletion equal to the statutory rate during his ownership of a property. These cases involve production of the property until sale or abandonment (perhaps through mechanical failure) prior to the time when the 50% of net income provision becomes effective. The allowable depletion realized over the life of a property producing to its economic limit and involving normal depreciation deductions must be less than the 27-1/2% statutory rate under the 50% of net income provision.