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Accounting for the Depletion of Oil Lands

BY HARVEY A. ANDRUSS

ACCOUNTING DEFINITION OF DEPLETION

Depletion, in its general usage, is the loss resulting from the exhaustion of natural resources through exploitation. In the production of oil, this consists of the removal of the physical content from an underground reservoir to the surface by means of pumps or natural gas pressure.

Fixed assets as a class are not subject to depletion as often as to depreciation. In America, assets subject to depletion are known as "wasting assets" although British nomenclature gives this term as much wider connotation. Wear, tear and obsolescence are not factors in depletion. Depletion of oil wells is the reduction of the amount of the content of the producing property through the extraction of oil or gas.

In a few cases, depletion and depreciation are computed and treated in the same manner—as, for instance, the depreciation of fixed assets situated at a well. When the oil is removed the machinery and buildings may possess little or no salvage value. Or the scrap or salvage value may be estimated in terms of the life of the production. Since the bulk of the mineral and fixed assets has coterminous life they may be depleted and depreciated at the same rate. This will be on the basis of the number of barrels of oil produced as related to the total expected production. The unit-cost method of computing depletion and the production method of computing depreciation are similar mathematical operations.

Since the original theory of depletion was developed and stated in relation to timber lands and mines the exhaustion of oil lands presents some modifications of the theory.

FACTORS PECULIAR TO THE DEPLETION OF OIL LANDS

The physical factors surrounding the oil industry in its extractive or production phase affect the application of the theory of depletion on account of the following situations:

- (1) Difficulty of valuation of an underground liquid asset;
- (2) Migratory nature of oil reserves;

- (3) Carrying cost of undeveloped properties;
- (4) Uncertainty of discovery of oil;
- (5) Uncertainty of estimated production;
- (6) Fire loss;
- (7) Fluctuations of the market price of crude oil.

The last named situation has been added since the government threat to control production.

Lack of space does not permit a discussion of the problem of the valuation of oil lands. Neither is it possible to explain the different methods of calculating depletion. Both these matters involve the engineer as much as the accountant. Depletion deduction for purposes of reporting income tax is another vital problem which is beyond the compass of this paper.

NATURE AND TREATMENT OF DEPLETION

Oil-producing properties, being wasting assets, decrease in value through the removal of the oil or gas content. This lessening in value, known as depletion, is determined periodically and charged as an expense or cost of production.

From the point of view of considering the lifting of oil to the surface under gas pressure or by means of pumps as a manufacturing process, the application of labor to materials, it would seem that depletion is a cost of oil in the ground, hence a material cost. The cost of lifting, or bringing, oil to the surface is a direct cost (of labor or materials). The combination of the cost of oil in the ground and the lifting expense represents something akin to the prime cost of the manufacturer. Operating expenses, not directly related to bringing oil to the surface, correspond to manufacturing or factory overhead. Thus it seems that depletion should be placed in the cost-of-goods-manufactured (or sold) section of the operating or manufacturing statement rather than in the expense section where we find depreciation.

Extracting oil from an underground reservoir is, however, generally treated as an expense in the operating statement in the period in which the oil is removed, by means of a depletion deduction computed at a more or less constant rate. The amount of the depletion sustained each period may vary materially. Over the period of exploitation, the total depletion deductions are expected to equal the investment of the operator or discoverer.

One fact is paramount. Once oil is discovered the value of oil reserves bears no relation to the investment of the operator

or the expenses of the discovery process. The "present value" of an oil reserve is based on the following principles:

- (1) That from each property there will be produced a certain total quantity of oil;
- (2) That in the production of that oil a certain total quantity of money will be expended;
- (3) That a certain total amount of money will be received from the sale of such oil;
- (4) That the total net receipts will be the total gross receipts less the costs of development and production;
- (5) That the present value of the net receipts must be such an amount that when invested by the purchaser it will be returned with a certain rate (from 6% to 8%) of interest additional during the life of the property.

If the present value computed by the engineer is greatly in excess of the cost (the investment of the discoverer) value, the difference may be treated as appreciation.

It should be remembered that the declaration of dividends in corporations exploiting natural resources is not limited to the earnings of the concern as shown in the free and earned surplus account.

THREE QUESTIONS AFFECTING DEPLETION PROCEDURE

Although there are many questions which may be raised regarding depletion and its ramifications, these three questions are more or less fundamental:

- (1) Shall the property account be carried on the books at cost or present value?
- (2) How shall the depletion sustained be recorded on the books each period?
- (3) How shall property, depletion sustained and depletion-reserve accounts be depicted on the financial statements?

The last question pertains to the introduction of appreciated values into the property account, the treatment of the depletion sustained account in the operating statement, and the depletion reserve and surplus from appreciation accounts on the balance-sheet.

METHODS OF RECORDING APPRECIATION

The depletion of an asset carried on the books at cost value is fairly simple; but, when wasting assets have been appraised and

entered on the books at an appreciated value a modification of general accounting theory is necessary.

When a building or plot of land is written up on the books for some reason the possibility of anticipating profits and declaring dividends out of capital is to be avoided. The fixed assets of the average business are intended for use and not for sale, but oil wells are fixed in the sense that there are equities in the surface or mineral rights which give the exploiter the right to remove the contents in the ordinary course of business.

The declaration of dividends out of capital is not a problem to the board of directors in the sense that they are not allowed by law to dissipate the original investment of the stockholders.

Most corporations expecting to continue the production of oil after the exhaustion of present holdings, restrict dividend declaration to earnings. If values greatly in excess of the costs of discovery are to be maintained as part of the invested capital, appreciated values must be reflected on the books. Otherwise, depletion sustained on cost having been provided, the profits will be unusually large and in turn will result in the declaration of liberal dividends. At the end of the period of exploitation, the depletion reserve will contain an amount equal to the cost of discovering the property; while assets have been used to pay the liberal dividends without considering the depletion on the appreciated value. Since dividends may be declared from profits, capital or appreciation (when realized) the records should be kept so as to indicate clearly the source of the payments to stockholders.

An oil property estimated to produce 2,000,000 barrels cost \$700,000 to discover and put under pump. If the present value according to the appraisers is \$1,200,000, appreciation to the amount of \$500,000 may be recorded in one of the three following ways:

Method 1

Producing properties	\$500,000	
Surplus from appreciation		\$500,000
To record the appreciation and add it to the cost value of \$700,000 to increase the value of producing properties to \$1,200,000.		

Although the merging of cost and appreciated values is criticized by some accountants, this method is a recognized application of accounting theory.

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Method 2

Appreciation of producing properties.....	\$500,000	
Reserve for appreciation.....		\$500,000
To record the appreciation in a separate account and set up a contra reserve account.		

At all future times these two accounts will equal and will be subtracted from one another on the balance-sheet so as to carry the properties at cost. However, depletion is sustained on the appreciated value of \$1,200,000.

Method 3

Appreciation of producing properties.....	\$500,000	
Unrealized surplus from appreciation.....		\$500,000
To record the appreciation in an account separate from the cost and at the same time credit a special capital surplus account so as to make the appreciation unavailable for dividends.		

Methods 2 and 3 are used in the oil industry while method 1 is suggested for use in other situations.

Under method 1 the reserve account is expected to equal the amount of the original cost before any transfer is made from the surplus-from-appreciation account to the surplus-available-for-dividends account. Reduced to simple terms, this method consists of having all wells pay their cost by calculating depletion on a basis higher than cost (appreciated or present value), after which all income, having absorbed depletion and operating expenses, remaining is the operating profit. Then transfers are made from the surplus-appreciation account to the surplus account.

The merging of the cost and the appreciation elements in the same account and the penalizing of the early years of production are the chief reasons for the inability to apply method 1 to the oil industry.

RECORDING DEPLETION SUSTAINED (EXPENSE OR COST)

The following entries are based on a yearly production of 650,000 barrels from an estimated reserve of 2,000,000 barrels which cost \$700,000 to drill and discover and is now valued at \$1,200,000 on the books:

Depletion sustained (expense or cost).....	\$390,000	
Reserve for depletion.....		\$390,000
To record depletion on the appreciated value @ 60¢ for 650,000 barrels of oil produced.		

The unit-cost method of calculating depletion provides for the division of the cost (or appreciated) value by the number of barrels of expected production, which is \$1,200,000 divided by 2,000,000 barrels, giving a value per barrel in the ground of \$.60. Each period the number of barrels removed is multiplied by the unit value per barrel. The depletion sustained is \$390,000, found by multiplying 650,000 barrels by \$.60. In effect this means that each barrel removed represents \$.35 on the basis of the cost and \$.25 on the amount of the appreciation. In other words, the depletion sustained on cost is \$227,500 and \$162,500 on appreciation, which when added give \$390,000.

The depletion sustained on cost should be separated from the depletion sustained on appreciation in the schedules and the records should be kept to permit the making of statements which will clearly show both.

A statement of earnings which follows shows the treatment of depletion sustained as a cost of oil in the ground. It is based on the above entry, using \$390,000 as the amount of loss sustained.

Statement of earnings (depletion based on appreciated value)

Earnings:	
Sales of oil during the period	\$1,500,000
Value of oil sold:	
Crude-oil stock, Jan. 1, 1936	\$575,000
Depletion sustained:	
650,000 barrels @ 35¢ (cost)	\$227,500
650,000 barrels @ 25¢ (apprec.)	162,500
Present value of oil taken from ground	390,000
Value of oil available for sale	\$965,000
Crude-oil stock, Dec. 31, 1936	600,000
Value of oil sold	365,000
Gross profit from operations	\$1,135,000
Expenses:	
Development expenses	\$500,000
Lease operating and lifting expenses	100,000
Other expenses	150,000
Total expenses	750,000
Surplus net profit	\$ 385,000

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Development expenses are the largest item of expense on the above statement. The outlay necessary to discover, drill and develop new properties is conservatively handled by this method. However, if discovery of oil is not the vital problem, the drilling and development of new wells may be debited to the work-in-progress account. This subdivision of the property account is the account to which all expenditures are entered up to the time the well is put under pump or in production. Corporations vary in their attitude toward handling this important item. Whether the expenditures are expenses or assets depends primarily on whether the well is a producer or a "dry hole."

If the depletion sustained were computed on the basis of cost, the surplus net profit would be greater by \$162,500, the amount of the depletion on appreciation. This would make the surplus net profit \$547,500 (\$162,500 plus \$385,000). Greater dividends may be declared, but no provision is made for the maintenance of the amount of the appreciation as a fixed asset of the business if the board of directors so desires. If a corporation does not expect to continue the production of oil beyond the exploitation of present properties, the declaration of dividends based on earnings of \$547,500 is not only legally permissible but desirable. On the other hand, stockholders should clearly understand that only the cost of discovering, drilling and developing to the time of pumping is being maintained in the depletion reserve account. None of the difference between cost and present value is being plowed back into the business.

Under method 1, the sections of the balance-sheet are:

Fixed assets:

Producing properties (cost and appreciation)	\$1,200,000
Less—reserve for depletion	390,000
	<hr/>
Book value of properties	810,000
Other fixed assets (net)	380,000
	<hr/>
Total fixed assets	\$1,190,000
<i>Other assets</i>	1,700,000
<i>Total assets</i>	<u>\$2,890,000</u>

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<i>Net worth:</i>	
Capital stock outstanding	\$1,500,000
<i>Surplus:</i>	
Appreciation of properties	\$ 500,000
Net profit for 1936	385,000
	885,000
Total surplus	885,000
Total net worth	\$2,385,000
<i>Liabilities</i>	505,000
	2,890,000
Total net worth and liabilities	\$2,890,000

The contra account for surplus from appreciation is a debit to the producing properties account. No transfers may be made to surplus available for dividends until the depletion reserve is equal to the cost of the property. This conservative rule applies to corporations which can not declare dividends out of capital or are likely to anticipate profits before they are realized. However, it is not used widely in the oil business.

Under method 2, where appreciation is reflected in a separate property-appreciation account by crediting a reserve for appreciation account as follows:

Depletion sustained (cost or expense)	\$390,000	
Reserve for depletion (cost)		\$ 227,500
Property appreciation		162,500
To record the depletion sustained on 650,000 barrels of oil @ 60¢.		

An amount equal to the depletion sustained on the appreciated value is considered realized and the following entry is made:

Reserve for appreciation	\$162,500	
Surplus (available for dividends)		\$ 162,500
To transfer the realized portion of the appreciation from the reserve-for-appreciation account to surplus.		

Under method 2, the sections of the balance-sheet are:

<i>Fixed assets:</i>		
Producing properties (cost)	\$700,000	
Less—reserve for depletion	227,500	\$ 472,500
	327,500	
Appreciation of producing properties	\$327,500	
Less—reserve for appreciation	327,500	
	860,000	
Other fixed assets (net)		380,000
		1,240,000
Total fixed assets		\$ 852,500

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<i>Other assets</i>		\$1,700,000
Total assets		\$2,552,500
<i>Net worth:</i>		
Capital stock outstanding		\$1,500,000
Surplus:		
Net profit from 1936	\$385,000	
Realized appreciation transferred from reserve- for-appreciation account	162,500	547,500
		\$2,047,500
<i>Liabilities</i>		505,000
Total net worth and liabilities		\$2,552,500

Stating producing properties at cost from which a reserve for depletion, computed on appreciated value, is subtracted, is the core of the procedure under method 2. The appreciation account is credited away bit by bit to the amount of the depletion sustained on the amount of the appreciation. The total asset figures are never affected, since the reserve-for-appreciation account offsets the appreciation. It is not quite clear whether the reserve for appreciation is an operating reserve, a valuation reserve, a true or surplus reserve or a kind of a suspense account.

Two considerations are important to consider in method 2:

- (a) The amount of the appreciation is not shown on the statements after the first periodic adjustment is made; and
- (b) The husbanding of past gains so as to continue is not encouraged since the method of reflecting the realization of appreciation leaves the stockholder in doubt whether he is receiving a liquidating dividend, a dividend declared from profits or a division of the appreciated values.

The comparative amounts of the cost value and the appreciation of the wasting assets is of paramount importance. These figures should be available on the balance-sheet as long as the properties are being exploited.

Under method 3, possibly the most widely used of appreciation procedures, the entries at the end of the accounting period are:

Depletion sustained (cost or expense)	\$390,000	
Reserve for depletion (cost)		\$227,500
Reserve for depletion (appreciation)		162,500
To record the depletion on 650,000 barrels of oil @ 35¢ a barrel on cost and @ 25¢ a barrel on the appreciated value.		

Unrealized surplus from appreciation	\$162,500	
Surplus (available for dividends)		\$162,500
To transfer the realized portion of the appreciation to earned surplus.		

The full effect of method 3 is shown in the condensed balance-sheet of the Green River Oil Company. The same basic facts and figures are used as for previous illustrations.

REALIZING APPRECIATION

Some accountants feel that appreciation, the increase in value in fixed assets due to factors other than operation of a business, can only be realized through the sale of assets. This ultra-conservative point of view does not permit the reflection of other than cost values in the fixed-asset accounts.

Another conservative treatment writes up the fixed-asset account to the appraised value and credits a special capital-surplus account. This reflects the present value of the asset on the books and at the same time avoids anticipating profits from sale and making them available for the declaration of dividends. When the property is sold the profit, or the appreciation, is realized by receiving more than the cost value in cash. The appreciation thus realized is available for dividend purposes.

Every time a barrel of oil is brought to the surface, a part of the producing properties is sold. When land, buildings and machinery are sold the transaction takes place in its entirety at one time. Appreciation of oil properties is realized by the actual physical diminution of the physical content of the well over the life of production. Wasting assets diminish measurably each day, while the other fixed assets decrease in value with relation to their life or resale, scrap or salvage value.

Fixed assets and wasting assets are only superficially alike. Depreciation and depletion are losses, expense or costs depending on the point of view of the accountant. At least all agree that they are deductions from the gross earnings or profit. Depreciation is the lessening in value of fixed assets due to use and other factors, while depletion is the lessening in value due to removal of a part of the asset which is sold. Valuation reserves may be set up for fixed assets subject to depreciation and wasting assets subject to depletion. These reserves chargeable against operations serve to reflect a book value of fixed assets during their use or exploitation and to encourage the replacement of similar

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property when present assets no longer exist in usable quantity or form.

Another recognized practice writes the fixed asset up to the appraised value and credits the difference between the cost and present value to a capital surplus appropriately named to reveal its origin and nature. With each provision for depreciation on the appraised value, a transfer is made to the surplus (available for dividends) account from the special capital-surplus account. This realizes the appreciation through charging depreciation against the earnings for the increased value. If earnings are not sufficient to bear this increased deduction any time in the future or the appreciation can not be realized at the time of the sale of the property, the directors may find that they have been declaring dividends when profits were not available. This situation has no legal significance for directors of an oil company, hence this is not a valid objection to exploiting natural resources.

Depletion and depreciation are not subject to identical accounting procedures in treating the realization of appreciated values.

Condensed balance-sheet of the Green River Oil Company at December 31, 1936

(Reflecting appreciated values as outlined in method 3)

<i>Assets</i>		
Current assets		\$1,500,000
Fixed assets:		
Producing properties (cost)	\$700,000	
Reserve for depletion (cost)	<u>227,500</u>	\$ 462,500
Appreciation of producing properties	\$500,000	
Res. for depletion (apprec.)	<u>162,500</u>	<u>337,500</u>
Book value of property		\$ 810,000
Other fixed assets	\$400,000	
Less—reserve for depreciation	<u>20,000</u>	<u>380,000</u>
Total book value of fixed assets		1,190,000
Deferred charges		200,000
Total assets		<u><u>\$2,890,000</u></u>

<i>Liabilities</i>		
Current liabilities		\$ 505,000
Net worth:		
Capital stock	\$1,500,000	
Surplus:		
Appreciation of prod. prop.	\$337,500	
Earnings of 1936	\$385,000	
Realized appreciation	162,500 547,500	
Total surplus	885,000	
Total net worth		\$2,385,000
Total liabilities and net worth		\$2,890,000

The results of methods 2 and 3 are the same with respect to surplus available for dividends but vary with regard to the manner of reflecting appreciation and its related depletion reserve on the balance-sheet.

MISCONCEPTIONS OF DEPLETION PROCEDURE

Although mines and timber tracts are physically different from oil lands, thus causing some modifications of the accounting theory of depletion, it does not follow that basic principles can be changed. Depreciation and depletion are not identical, but these phases of the lessening in value of fixed assets due to different causes does not mean that the valuation reserve may not be used, or, if used, is radically changed in nature.

Along with the common misconception that one capital-surplus account may be used to record all increase in book values, no matter from what cause or source, is the practice of declaring dividends out of the depletion reserve. This arises from a misguided idea of valuation-reserve accounts. They should not be confused with surplus or true reserves. In effect, the charging of a dividend to the reserve-for-depletion account is the same as declaring a dividend out of capital. Although legally permissible it misleads the stockholders unless it is clearly labeled as a "liquidating dividend" or a return of the capital investment.

Suppose the following balance-sheet is made before the dividends are declared:

Assets	\$100,000
Less—depletion reserve	20,000
	\$ 80,000

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Capital stock.....	\$ 80,000
Surplus.....	(none)
	\$ 80,000
	\$ 80,000

The management finding it has no earned surplus, may declare the following dividend:

Reserve for depletion.....	\$10,000	
Dividends payable.....		\$10,000
To declare a dividend from the depletion reserve.		

Justification is based on the argument that had no depletion reserve been set up there would now be \$20,000 in the surplus account representing the profits of the past not considering depletion. The results of such a policy appear after the dividend declaration is put on the balance-sheet as follows:

Assets.....	\$100,000
Less—depletion reserve.....	10,000
	\$ 90,000
	\$ 90,000
Dividends payable.....	\$ 10,000
Capital stock.....	80,000
Surplus.....	(none)
	\$ 90,000
	\$ 90,000

By decreasing the depletion-reserve account \$10,000 to incur a liability to stockholders, the values of the assets are overstated a corresponding amount. The payment of the dividend is made:

Dividends payable.....	\$10,000	
Assets.....		\$10,000
Liquidating dividend paid out of assets or capital of the corporation.		

The resulting balance-sheet is as follows:

Assets.....	\$90,000
Less—depletion reserve.....	10,000
	\$80,000
	\$80,000
Capital stock.....	\$80,000
Surplus.....	(none)
	\$80,000
	\$80,000

Such irregular accounting procedures as declaring dividends out of a valuation reserve were fostered by the early revenue acts, especially those of 1921 and 1924. The treatment of depletion in the records of the corporation was primarily concerned with receiving the largest possible deduction so as to pay the lowest possible income tax.

The income-tax laws have done much to hinder the development of sound accounting principles relating to the depletion of oil lands. However, it is to be remembered that the allowance of depreciation and depletion deductions for purpose of computing the income tax has done a great deal to introduce these items as expenses on the statement of profit and loss. Once allowed, the income-tax laws frequently violated accounting practices in the name of simplifying the calculation of the depletion deductions. The section relating to depletion of oil lands was first incorporated in the revenue act of 1926 and reads as follows:

“In case of oil and gas wells the allowance for depletion shall be $27\frac{1}{2}$ per centum of the gross income. Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property, except in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph.”

Concisely stated, the depletion allowance for income-tax purposes is $27\frac{1}{2}\%$ of the gross income, not to exceed 50% of the net income, except where the depletion on cost would exceed that figure. In that case depletion on cost would be the allowable deduction.

The question to be answered is: Why is $27\frac{1}{2}\%$ of the gross income not 25% or 30% ? Why compute depletion as a fixed percentage of the gross income? Is depletion based on property values or income from property?

This arbitrary income-tax point of view is the result of the difficulties found by income-tax auditors in trying to arrive at reasonable depletion allowance when there are so many book methods of handling appreciation, depletion reserves and realized appreciation on the records of the oil producers.

THE ADVANTAGES OF METHOD 3 IN RECORDING AND REPORTING DEPLETION

By way of summary, although advantages and disadvantages of all three methods have been pointed out during this

discussion, let us consider the following advantages found under method 3:

- (1) It presents a true picture to the reader of the balance-sheet in an industry where the amount spent to discover, drill and develop oil lands is in no wise related to the production or lack of it (as in the case of a "dry hole");
- (2) The nature of dividends declared is apparent to the stockholder. Dividends from profits, from capital invested or from realized appreciation are clearly set forth;
- (3) It provides for the consolidation of gains through the appreciation of property values based on an appraisal, so that the difference between cost and discovery or present value may become a part of the capital investment if the board of directors decide not to declare dividends from this source;
- (4) Financing requires all the facts for the issuance of more stock or bonds—thus appreciation based on an appraisal gives the picture required for this operation.

Although general accounting theory discourages the placing of both cost and appreciated values on the records of a corporation as such a practice is apt to lead to misinformation and unsound dividend policies, method 3 clearly divides the cost and the appreciated values of the fixed-asset accounts, separates the depletion reserves from one another and draws a sharp line of distinction between surplus from appreciation and surplus available for dividends.