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Accounts of an Oil Company

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The Accounts of an Oil Company *

III

By H. G. Humphreys

The articles on this subject which have appeared in previous issues of The Journal deal with properties and income in general terms. The details are yet to be discussed. However, before proceeding with such discussion certain forms of records might be briefly considered.

Let it be assumed that the accounting company has adopted the following described cash-journal and auxiliaries:

Cash-journal
Month and year
Date
Voucher No.
Name and particulars

1. Cash	Dr.	
2. Accounts receivable	&	
3. Accounts payable	Cr.	
4. Material in warehouses	C	
5. Deferred accounts	o	Detailed in
6. Properties	l	auxiliary records
7. Operations and trading	u	
8. General ledger	m	
Account no.	n	
Title of account	s	

Auxiliaries 1 to 5

No explanation of these auxiliaries is necessary in this article.

Auxiliary 6 Property record
Auxiliary 7 Operating and trading record

A separate sheet is assigned to each lease or other unit. This sheet has 14 period columns—one for the previous year's total and accumulated total from inception, one for transactions of each month of the current year and one for the current year's total and accumulated total from inception to date. The heading contains essential descriptive detail in each case, respectively, and the

* The first article in this series appeared in The Journal of Accountancy for February, 1933. The second appeared in the March, 1933, issue.—Editor.

vertical classification corresponds to the company's card of accounts.

The entries in columns 6 and 7 of the cash-journal are analyzed on sheets designed for that purpose (written or printed from punched cards), providing for direct voucher reference. The monthly net totals of analysis sheets are carried to the respective sheets in the auxiliary record.

General Ledger 8

At the close of each month a summary of the month's transactions of columns 1 to 7 of the cash-journal is carried to column 8, general ledger, in convenient form for posting. The cash-journal entries for the month are thus balanced in the latter column. All direct postings to the general ledger (column 8) are fully described or give reference to an auxiliary containing full description. Having essential detailed information thus available direct from the books, budget forecasts, comparison of various costs and other determinations are facilitated. Such a set-up is made to order for the independent auditor.

. . . . .

Coming to the details of properties, reserves and income, by departments, it may be stated that the greatest volume of transactions is applicable directly to units (leases, for example). As to the remaining volume, the greater part may be allocated directly to operating departments as a whole, leaving a remainder (which would probably not exceed five per cent. per annum on the average depreciated investment) to be apportioned over operating departments on the basis of average depreciated investment. Having all profit-and-loss figures of every description, excepting non-recurring income, thus spread over operating departments, one can now safely consider costs. For example, the average over-all cost of producing a barrel of crude oil for a given period is found to be (a) lease operating costs, district costs (apportioned on "well" or other basis), direct departmental costs, depletion, development costs, depreciation, amortization of undeveloped investments, canceled leases and proportion of unallocated general expenses, less earnings other than crude oil, divided by (b) barrels of crude oil produced during the period. While it is true that a producing company without undeveloped acreage to draw from to replenish declining production is on the way out of the produc-

ing business, it is also true that the cost of carrying such acreage can not be omitted from the calculation of the cost of producing oil, if the company is to play on the safe side.

Oil and Gas Properties

A volume might be written explanatory of various kinds of oil interests. To be of real value, the volume should contain a complete correlation, by typical cases, of the grant or assignment, operating agreement, a forecast of costs and earnings and a different picture to represent an account of "actual" transactions—both from the grantor or assignor and grantee or assignee points of view. For present purposes, the following general descriptions are submitted:

Land in fee—as the name implies, represents the title in fee simple to the surface as well as to the mineral and water rights of a given property.

Royalty—an interest retained by fee owner on granting oil and/or gas rights in a given property—such interest being, say, one-eighth of the oil and/or gas saved, without charge for development and operating, but subject to charge of various state and local taxes.

Working interest—oil and/or gas rights (say, seven-eighths) originally granted by the fee owner. The holder of a working interest is privileged to enter upon the premises and explore for and produce oil and/or gas at his own expense and risk, but without damage to the rights remaining with the fee owner or his assigns.

In many instances the working interest is owned by several parties, as the result of assignments subsequent to the original grant, one of whom operates the property.

The Mid-continent Oil and Gas Association, Tulsa, Oklahoma, under date of April 11, 1930, issued a bulletin describing a "*Proposed Uniform Accounting Procedure on Joint Interest Leases.*" The groundwork of this procedure was laid by the Petroleum Accountants Society of Oklahoma. The exhibit "A" given in the bulletin mentioned may be made part of an operating agreement. It is too lengthy to be repeated verbatim in this article, but its perusal is recommended to readers who desire more information as to the normal and special transactions of joint leases.

Over-riding royalty—an interest that originates in the assignment of rights in a working interest, whereby the assignor retains

a part of the working interest without bearing any part of the costs of development and operation. Its rights are limited to the express terms of the contract. For example:

(a) Assignor might sell, assign, transfer and set over unto assignee, subject to reservations, all of assignor's right, title and interest (say, seven-eighths) in and to a certain oil and gas lease; assignor reserving unto himself (1) the said lease and all rights thereunder so far as the lease covers all the land which lies below, say, 3,000 feet, and (2) an interest of one-seventh of seven-eighths of all the oil and gas saved from the land above 3,000 feet.

Books.—Ordinarily, assignor's oil would be run for his account, the purchasing company paying him direct the proceeds of his oil, less production tax withheld for the state. His share of gas would be paid him by the assignee.

(b) For $50,000 down cash payment, assignor might sell, assign, etc., subject to reservations, all of its right, title, etc. (say, seven-eighths); assignor reserving a fractional interest in the first oil and gas saved, to be credited to assignor at the sale price thereof until the credit should equal, say, $50,000. This credit is usually known as an oil bonus. Fractional interest might be as follows:

One-sixteenth of oil and gas saved so long as oil production would not exceed 500 barrels a day.

One-eighth so long as oil production should exceed 500 barrels a day.

Books.—Oil, in this case, would probably be run for the account of assignee who, in turn, would account to the assignor for latter's share of the proceeds, according to contract, until such credits to assignor should equal the sum of $50,000—oil bonus.

A difficult question of depletion might arise here. The assignee has paid $50,000 initial cash bonus for the lease and bears all costs of development, equipment and operations, receiving earnings in the sum of the proceeds from seven-eighths of the oil and gas saved, less the amount of earnings due assignor. If such earnings to assignor were sufficient to pay off the $50,000 oil bonus during the first fiscal year of the assignee, all well and good; but, if production were to be in such quantity and/or at such prices that the oil bonus of $50,000 would not be liquidated in several years, on what basis should the assignee deplete his initial cash bonus of $50,000? The oil reserves of the entire seven-eighths working interest may be acceptably estimated, but, as the credit

to assignor consists of unknown barrels at unknown prices, the assignee's portion of the seven-eighths oil reserve estimate for depletion purposes is indeterminable. The popular and probably erroneous way of computing the annual amount of depletion of assignee's lease cost ($50,000) is to consider the payments on oil bonus as additional lease cost, earnings being credited in like amount, per contra. The lease cost (initial cash bonus) plus subsequent payments on oil bonus are then covered by reserves in ratio to the decline of the entire seven-eighths oil-reserve estimate. If the oil bonus is merely a lien on the oil in place, the popular procedure mentioned is correct. If, however, the oil bonus represents an over-riding royalty—an economic interest in the oil in place—then the assignee should deplete on an oil reserve basis of thirteen-sixteenths when paying on a one-sixteenth basis and on an oil reserve basis of three-fourths when paying on the one-eighth basis. And should the property be in a state in which ad-valorem tax is laid on producing property, the assignee here would pay such tax on the same proportion as the run of oil, viz.: thirteen-sixteenths or three-fourths of the oil in place.

Carried interest—an interest retained by the assignor on assigning rights in a working interest. The carried interest participates in the excess of earnings over the operating costs plus development and equipment costs and, in some cases, plus leasehold cost to assignee, as may be provided in the contract. For example: (a) Assignor might assign all of his title in a certain lease upon a down cash payment of, say, $10,000, subject to reservation, assignee to retain the proceeds of all of the oil and gas saved until the total proceeds should equal the cost of development, equipment and operating (pay-out) when assignor would participate in, say, one-fourth of the net proceeds thereafter, similarly computed.

Books.—Carried interest would receive a complete detailed billing of all transactions from inception. When the pay-out status would be attained, one-fourth of all subsequent development, equipment and operating costs would be charged and one-fourth of all earnings would be credited to assignor. Payments to assignor would be deferred if further development were contemplated. If the pay-out status, as defined in the contract, should not be attained, the entire loss would fall on the assignee.

(b) Assignor might assign title in a lease upon a down cash payment of $250,000, subject to reservations, assignee to retain all of the proceeds and to pay all development equipment and

operating costs, including all taxes; assignor to participate in one-half of the net profits, as shown by the assignee's books.

Books.—The assignor's share of the profits in this instance would be computed thus:

Total gross earnings (proceeds)		$
Deduct:		
Original cash bonus	$250,000	
Development		
Equipment		
Operating		
Administration—portion		
Income tax		
Remainder, say		$29,500
Deduct:		
*Additional bonus	$ 10,000	
Less: income-tax adjustment	500	9,500
Balance		$20,000
Whereof:		
*One-half to assignor		$10,000
One-half to assignee		$10,000

This is the sort of transaction that might originate in a curbstone offer expressed thus:

"Elmer, I don't want to bother keeping books—give me $250,000, you keep the books and send me the details monthly. Then give me one-half of what your net profit may be and I'll let you have the lease."

Partnership accounts

These so called partnerships are sometimes referred to as limited joint ventures. Assuming that each interest represented in a given venture constitutes an economic interest in the oil in place and each such interest is individually liable for all taxes—ad-valorem and/or production tax, income taxes, etc.—then each interest is a separate estate or part.

The operating "partner" keeps the books and renders each non-operating "partner" a complete detailed billing of transactions monthly, to the end that the non-operator may be as fully informed as is the operator as to the costs that are being incurred.

Non-producing investments—general ledger accounts

100. Royalty and lease costs, renewal cost, commission, recording fees, legal-costs
101. Reserve for amortization over terms of leases (leases usually run five years)
102. Subsequent costs, down to production or surrender of lease
    1. Rentals
    2. Exploration
    3. Dry holes, less salvage
    4. Other
103. Reserve for amortization of subsequent costs—(usually 100 per cent. in year in which incurred)

A separate sheet is given to each investment in the auxiliary record, classified horizontally as above—100 to 103. The head of the sheet shows:

Lease name and number
Section, township and range
District, county and state
Acreage
Ad-valorem and/or production tax
Proportion of interests
Term
Date of original grant and renewal date
Renewal provision
Rental provision
Contingent liability—oil bonus or carried interest
Class of lease—commercial or Indian land

Should the investment become productive, the costs, less reserve for amortization, are transferred to producing investment, account 104, the remaining costs being closed to reserves, 101 and 103. If the lease should be canceled, profit-and-loss is charged with the unamortized balance and the remainder is closed to the reserves.

No expenditures against undeveloped leases—rentals, for example—are charged direct to expense. Thus, the gross costs of undeveloped properties are readily available at all times.

Producing investments—general ledger accounts

104. Royalty and unamortized lease costs, intangible development and equipment
1000. Crude oil sales—external
1001. Crude oil sales—internal
1002. Crude oil inventory fluctuation
1003. Gas sales—external
1004. Gas sales—internal

1005. Miscellaneous earnings—external
1006. Miscellaneous earnings—internal
1100. Operating expenses

An auxiliary book is maintained in which a separate sheet is given to each property, having full description of the investment, with fourteen period columns—close of previous year, each month of current year and close of current year. The vertical features are as follows:

Investment Royalty or lease Development Equipment Losses, depreciation and adjustment Less: joint lessee's proportion Company's net investment	Entries to auxiliary are from analysis, by leases, of account 104, items found in column 6 of the cash-journal.
Earnings—barrels Production Oil sales Oil inventory fluctuation	Entries to auxiliary are from analysis, by leases, of accounts 1000–1006, items found in column 7 of the cash-journal. Division as between external and internal is made, but it is used for general ledger purposes only. Vouchers are designed to meet the convenience of analyzing.
Earnings—amount Oil earnings Oil sales Oil inventory fluctuation Gas sales Miscellaneous earnings Total earnings—net to company	
Operating expenses All labor Transportation Fuel and water Maintenance material Apportioned district expense Miscellaneous Less: joint lessee's proportion Taxes (less-joint lessee's portion) Insurance (less-joint lessee's portion) Total expenses to company	Entries to auxiliary are from analysis, by leases, of account 1100 items found in column 7 of the cash-journal.

If the volume of business justifies the use of machinery, all analyses of investment, earnings and expenses may be made by means of punched cards, which would require the vertical features of the auxiliary to be numbered.

Producing leases—equipment

The auxiliary record gives the entire transactions applicable to equipment, the portion representing outside interests being taken

up in a separate item—joint lessee's proportion. Most companies have a material supervisor through whose hands pass all requisitions for material, to enable him to fill them out of available stock, as far as may be. He then passes the partly filled or entire requisition to the purchasing agent. There is usually more material delivered to a property under development than is actually needed, the surplus material being brought under special control when the lease is equipped. This idle material is reported monthly, or oftener, by the lease foreman to the supervisor. At the close of each accounting period the company's interest in this idle material is transferred by non-ledger entry from investment (properties) to material and supplies (current asset).

A sub-auxiliary book is maintained to analyze equipment and material by job numbers, quantities, description and cost. This sub-auxiliary consists of a number of sheets for each lease, one sheet to each of the following named features:

Rigs and rig equipment	Miscellaneous tools
Tanks	Motors, generators and transformers
Boilers	Separators
Engines	Sucker rods
Powers	Pipe, by sizes
Pumps	Tubing, by sizes
Buildings	Casing, by sizes
Cleaning-out tools	Other equipment

Each item recorded in the sub-auxiliary is fully described, so that a set of sixteen sheets, assigned to a given lease, would serve to control all the equipment and idle material on such lease. A map of each lease is maintained which shows location of equipment—surface and underground.

Material may be transferred from lease to lease within a given district by mutual arrangement between lease foremen. Movement of material between districts, however, is usually done on the order of the supervisor. Material moved is covered by a "transfer," reported to office by transferor and acknowledged by transferee. A transportation ticket (showing distance, time, etc.) is sent to office with transfer, and the two are there compared.

The audit of material usually covers an entire district, so that shortages and overages between leases, due to field men's failure to issue transfers, usually counterbalance reasonably within the district. Differences not accounted for by inventory are charged, after approval, to losses, depreciation and adjustments (a feature

hereafter described) or to inventory adjustments, according to the circumstances of each case.

It often happens that the initial well is drilled and equipped free of cost to the outside interests, subsequent development costs being borne proportionately. The entire cost borne by the company on the free well is charged, of course, to development and equipment. In the equipment sub-auxiliary record a complete memorandum is kept of the cost of drilling and equipping the free well. In order to determine that the outside interests, say one-half, have been charged their full contractual share of investment costs, a summary is made as follows:

Total development and equipment cost	$
Less: memorandum cost of free well	
Remainder	$
Whereof one-half is joint lessees' proportion	$

If the free well were to be non-productive, the material would be the property of the operator. If, however, the well "came in" a producer, joint lessees could have a share in the material value. The following account will illustrate the point:

	General ledger		Assessment control Dr. (Cr.)				Sub-aux.
				Extract—auxiliary			
	Personal accts.	Cash or equiv.	Equipment	L. D. & A.	Jt. lessee proportion	Company proportion	Memorandum
1.	Free	($30,000)	$30,000		Free	$30,000	$30,000
2.	$15,000	(30,000)	30,000		($15,000)	15,000	
3.	(5,000)	10,000	(10,000)		5,000	(5,000)	
4.			(5,000)	5,000			
5.			(2,000)	2,000			
6.	(2,500)	5,000	(5,000)		2,500	(2,500)	
7.			(38,000)	38,000			
8.				$45,000	($7,500)	$37,500	
9.						($37,500)	
10.	($7,500)				$7,500		
11.		$45,000		$45,000			

1. Well No. 1 free to joint lessee.
2. Well No. 2 cost borne half and half.
3. Transferred from lease at condition value.
4. Depreciation—residue value of transferred material.
5. Material lost.
6. Salvage on abandonment at condition value.

7. Depreciation—residue value of salvaged material.
8. Net investment.
9. Company's reserve for depreciation.
10. Joint lessee proportion—proof.
11. Cost of material unrecovered.

Losses, depreciation and adjustment are chiefly composed of (a) net value of uninsured material actually lost through fire, tornado, etc., (b) cost less proceeds on material transferred from the property, (c) remaining cost standing charged to equipment on abandonment, after giving effect to salvage value. The reserve for depreciation at abandonment is adjusted to agree with losses, depreciation and adjustment (provided the working interest is fully owned), and the depreciation charge to profit-and-loss for the year is debited or credited, per contra. It sometimes happens that the lease has been over depreciated down to the close of the previous year. Should the company own only a part interest, then, on abandonment of lease, the company's reserve for depreciation of equipment would equal losses, depreciation and adjustment less joint lessee proportion, as given in the foregoing "assessment control."

It may be contended that on each transfer or loss of material the reserve should be charged its proper quota. Unfortunately, the proper charge is not easily determinable if the company computes depreciation in ratio to decline of oil reserves. Why depreciate on the straight-line basis when production might continue for any duration from one to fifty years? And there is an advantage in keeping all charges to reserve in suspense (losses, depreciation and adjustment).

There are probably not many carried interests in effect at the present time, but, in view of present economic conditions, this method of trading may become more popular. The carried interest, as has been explained, becomes a beneficiary when the investment, either wholly or in part, has been paid out by earnings. By having complete pure figures in the auxiliaries, settlements with carried interests may be made promptly and accurately, so far as the investment and operating charges apply against earnings. The contract may provide for other charges, such as an administrative allowance.

In order to adjust the reserve for depreciation on the balance-sheet at the close of the accounting period, a percentage of losses, depreciation and adjustment (equal to the percentage of reserve to

total equipment—computed as to each property) is credited to cost of properties and charged to reserve by non-ledger entry.

Producing investments—general ledger accounts

105. Reserve for depletion and depreciation on cost
106. Additional reserve for depletion under section 114 (b) (3) 1932 revenue act
107. Additional depletion—27½ per cent. basis over cost basis

} For income-tax purposes only

1101. Canceled leases
1102. Depletion of leasehold
1103. Development (depreciation)
1104. Depreciation of equipment

Section 114 (b) (3) of the federal revenue act of 1932 reads:

"In the case of oil and gas wells the allowance for depletion shall be 27½ per centum of the gross income from the property during the taxable year, . . . Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property, except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph."

Three simple examples of the application of this rule follow:

	1	2	3
Gross income	$100,000	$100,000	$100,000
Operating expense	10,000	10,000	10,000
Development	10,000	10,000	20,000
Depreciation	10,000	10,000	20,000
Proportion of overhead	2,000	2,000	2,000
Total deductions	32,000	32,000	52,000
Net income	68,000	68,000	48,000
50 per cent. of net income	34,000	34,000	24,000*
27½ per cent. of gross income	27,500*	27,500	27,500
Depletion on cost	20,000	40,000*	20,000
Depletion deductible	$27,500*	$40,000*	$24,000*

Example 3 (assumed to represent the first year's operation of a given lease) has a cost depletion of $20,000, but a deductible depletion of $24,000. The law seems to recognize the estate value of an oil interest as being possibly in excess of cost, such value being indeterminable at the commencement of operations.

From year to year some measure of this value appears. (The example under consideration indicates a 20 per cent. present additional value to the estate.) As the result of subsequent operations, this value would vary according to the variations of three factors—oil produced, gross income and deductions. The following is given to show the present additional value:

	Cost	Additional* value
Basic oil reserves—barrels	400,000	400,000
Produced in first year—barrels	80,000	80,000
Leasehold cost	$100,000	$20,000*
Unit rate of depletion	.25	.05
Amount of depletion	20,000	4,000

In the accounts additional depletion would be charged to account 107 and credited to account 106. These accounts might be kept in a private ledger, together with memoranda of non-taxable and non-deductible items, etc. All this would be done for the purpose of providing means for a ready reconciliation between published figures and income-tax figures.

It appears that, subject to proper expense deductions, at least in the case of a producing property, the following gross income is entitled to the benefits of section 114 (b) (3):

To fee owner
Cash bonus received (advanced royalties) and subsequent receipts (deferred royalties).

To over-riding royalty
Cash bonus and oil bonus received.

To carried interest
Cash bonus, and proportion of gross earnings after the lease has paid out according to contract.

To working interest
Gross earnings and, should a part of a working interest be sold, bonus realized from sale of part interest.

The allowances for depletion suggested in the foregoing are, in some instances, the subjects of court cases now pending.

For federal income-tax purposes, depletion on cost of a leasehold is determined by computing the reserve against investment in ratio to the decline, through production, of estimated oil reserves. Intangible drilling cost may be entirely covered by reserve in the year in which incurred or on the same basis as lease-

hold. Depreciation may also be on the same basis as that of leasehold or on any other reasonable basis that may be regularly used by the company.

Some concerns do not amortize non-producing investments in accordance with the procedure previously mentioned, although they capitalize all costs of every description. If the lease should be surrendered, they write off the accumulated cost at that time. Should the lease become productive, the accumulated cost to date is transferred to producing investment, to be returned through depletion. For balance-sheet purposes, a surplus reserve is usually created to bring non-producing investments within the safe zone of value at the balance-sheet date.

The matrices used for determining the depletion charge and also the status of each lease at the close of each year of its active life may be summarized as follows:

X Y Z Lease

Oil reserve at basic date—estimated barrels
Production by years—actual barrels
Production accumulated—actual barrels
Balance of oil reserves—estimated barrels

Gross earnings by years—oil, gas and sundries
(1) Gross earnings accumulated
Operating expenses by years
(2) Operating expenses accumulated
Operating earnings by years
Operating earnings accumulated
Depletion and depreciation by years:
Depletion of leasehold
Depreciation of intangible drilling cost (100% or less)
Depreciation of equipment
Total depletion and depreciation by years
(3) Depletion and depreciation accumulated
Net earnings by years
Net earnings accumulated

Investment
Leasehold cost
Intangible development cost
Equipment cost
Total by years
(4) Total accumulated
(3) Reserves accumulated
Investment less reserves

Pay-out status
(4) Investment accumulated
(2) Operating expenses accumulated
Total expenditures
(1) Gross earnings accumulated
Gross earnings in excess of expenditures

Depletion (a) cost of leasehold less previous reserve at close of year, divided by (b) balance of oil reserves at beginning of year gives (c) unit rate, which multiplied by (d) barrels of production for the year, gives (e) amount of depletion for the year. The oil production of each lease must be kept separate until run to purchaser.

Oil reserve is computed as to probable recovery from the first well. The reserve is afterwards built up, well by well, until the entire lease has been drilled.

Oil and gas properties—Conclusion

Accounts prepared as outlined in the foregoing paragraphs would show the balances of the following general ledger accounts, pure details of which would be found in the auxiliaries, divided by individual units of investment:

Non-producing investments
- 100. Royalty and lease costs, etc.
- 101. Reserve for amortization of leases
- 102. Subsequent costs
- 103. Reserve for amortization of subsequent costs
- 1101. Canceled leases

Producing investments
- 104. Royalty and unamortized lease costs, etc.
- 105. Reserve for depletion and depreciation on cost
- 1000. Crude oil sales—external
- 1001. Crude oil sales—internal
- 1002. Crude oil inventory fluctuation (lease stock tanks)
- 1003. Gas sales—external
- 1004. Gas sales—internal
- 1005. Miscellaneous earnings—external
- 1006. Miscellaneous earnings—internal
- 1100. Operating expenses
- 1102. Depletion of leasehold
- 1103. Development—depreciation
- 1104. Depreciation of equipment

In one of the later articles of this series departmental expense, general expense and internal facilities (water stations, telephone, etc., etc.) will be described.

[The fourth article of this series is to appear in THE JOURNAL OF ACCOUNTANCY for July, 1933.—EDITOR.]