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Proposed Changes in Accounting for Oil and Gas Reserves

Louisa Ming-Hwa Hung

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PROPOSED CHANGES IN ACCOUNTING
FOR OIL AND GAS RESERVES

by

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1966



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An Independent Study
Submitted to the Faculty
of the
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in partial fulfillment of the requirements
for the degree of
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energy situation makes the oil and gas industry an area of vital concern not only to the owners and creditors of companies engaged in oil and gas exploration activities, but also to society as a whole.

The high cost of inflation in recent years has caused public distrust of the business community, especially "big corporations" were identified as the source of price increases. The media is continuously reporting that every year corporations attain record profits. Under inflationary conditions, costs of assets acquired in the past when dollars were worth more are not recovered in terms of today's equivalent dollars of reduced worth if related charges in current operations represent historical units of money as originally recorded. Failure to recover costs in equivalent dollars means corresponding overstatement of earnings in equivalent dollars. And these are the earnings upon which the payment of income taxes is presently based. Because income taxes are levied on corporate earnings that do not reflect full recovery of costs in dollars of equivalent worth, a company is taxed at effective rates higher than apparent rates. This invisible taxation of unrecovered costs is invisible erosion of shareholder's capital. On August 1, 1977, the Financial Accounting Standards Board (FASB) held

CHAPTER I

INTRODUCTION

Background of this Study

The impact of oil and gas shortages on the United States' energy situation makes the oil and gas industry an area of vital concern not only to the owners and creditors of companies engaged in oil and gas exploration activities, but also to society as a whole.

The high cost of inflation in recent years has caused public distrust of the business community, especially "big corporations" were identified as the source of price increases. The media is continuously reporting that every year corporations attain record profits. Under inflationary conditions, costs of assets acquired in the past when dollars were worth more are not recovered in terms of today's equivalent dollars of reduced worth if related charges to current operations represent historical units of money as originally recorded. Failure to recover costs in equivalent dollars means corresponding overstatement of earnings in equivalent dollars. And these are the earnings upon which the payment of income taxes is presently based. Because income taxes are levied on corporate earnings that do not reflect full recovery of costs in dollars of equivalent worth, a company is taxed at effective rates higher than apparent rates. This invisible taxation of unrecovered costs is invisible erosion of shareholder's capital. On August 1, 1977, the Financial Accounting Standards Board (FASB) held

public hearings on the subject "Conceptual Framework for Financial Accounting and Reporting". FASB was undertaking a great experiment, requiring information about asset and liability values as opposed to the present practices of reporting on completed transactions, at prices actually realized. This is current value accounting. The Objectives of Financial Reporting are:

Financial statements should provide information useful to investor and creditor's decision making; financial statements should provide information to investors and creditors about the prospects of receiving cash from their investments; and financial statements should provide information about economic resources of an enterprise and about earnings.¹

Decision makers such as investors, creditors, and management realize that financial statements prepared using "generally accepted accounting principles" may not reflect current economic realities. Under a current value accounting system, periodic changes in values are recognized, without regard to whether a transaction takes place or not. A principal problem with any form of current value accounting is the inability to select a single set of assumptions to determine value. In oil and gas industries, a field will have to take five years or more to develop for production and perhaps twenty to thirty or even more years to complete production, so the problem of allocating the costs of incomplete transaction among accounting periods becomes more serious since the operating cycle is stretched out over so many years. In addition to this problem, the oil and gas industries have a special

¹"Objectives of Financial Reporting by Business Enterprise." AICPA Professional Standards, pp. 7, 825.

future relating to the discovery values of mineral reserves.² The mineral reserves discovered have a utility value in the marketplace which has no predictable constant relationship to the individual costs of exploration or development. Under present historical cost accounting, this reserves value is not shown in the financial statement because revenue should not be recognized until a transaction takes place.³ Those problems have stirred controversies in financial accounting and reporting for oil and gas producing companies for many years.

Because of the serious national energy policy implications on the continuing role of the oil and gas industry, in 1975, the Energy Policy and Conservation Act, Public Law 94-163, was enacted by Congress. Title V, Section 503 of the act grants the power to the Securities and Exchange Commission:

To prescribe rules applicable to persons engaged in the production of crude oil or natural gas, or make effective by recognition, or by other appropriate means indicating a determination to rely on, accounting practices developed by the Financial Accounting Standard Board, if the Securities and Exchange Commission is assured that such practice will be observed by persons engaged in the production of crude oil or natural gas to the same extent as would result if the Securities and Exchange Commission had prescribed such practices by rule.⁴

² Robert E. Field, "Financial Reporting in the Oil Industry." CA Magazine, p. 7.

³ August, 1978, the SEC finally decided to allow companies to use either the full cost method described by Accounting Series Release

Ibid., p. 8.

⁴ "Financial Accounting and Reporting by Oil and Gas Producing Companies," AICPA Professional Standards, pp. 10, 479.

Efforts Standard," Management Accounting, July 1978, p. 9.

The SEC's Accounting Series Release No. 190, issued on 23 March 1976 requires supplemental disclosure of specified replacement cost amounts on the financial statements filed with the SEC. The release requires the disclosure of the present value of future net revenues estimated to be received in the future from the production of proved oil and gas reserves.

Securities Act Release No. 5706, issued on May 12, 1976, requires that certain information relating to oil and gas properties, reserves and production be disclosed in recognition statements, proxy statements and reports filed with the Commission.

Since the issuance of the Financial Accounting Standards Board (FASB) Statement 19, which required oil and gas producers to use the "successful efforts" method of accounting instead of "full cost" method, the propriety of the statement was questioned and it suffered strong oppositions from governmental agencies. The Federal Trade Commission (FTC) had joined the Department of Energy in opposing the adoption by the Securities and Exchange Commission of Statement No. 19. In a memorandum to the SEC, the FTC noted that a switch from "full cost" to "successful efforts" for most of the small companies would: have a negative effect on the earnings of these companies, result in material fluctuations in year to year earnings, and would limit the companies' ability to gain financing and compete with the major companies.⁵

In August, 1978, the SEC finally decided to allow companies to use either the full cost method described by Accounting Series Release

⁵Robert F. Randall, "FTC Urges SEC Not to Adopt Successful Efforts Standard," Management Accounting, July 1978, p. 9.

No. 258 or the successful efforts method set forth in Statement No. 19 in the next few years. For a permanent solution, the SEC proposed to develop a new accounting method called "Reserve Recognition Accounting",⁶ under which revenue will be recognized when the reserve is discovered and not when the oil and gas produced from the reserves is sold.

Objective of this Study

The main objective of this study is to analyze the controversies surrounding FASB No. 19, and to discuss the method of costing, the valuation of oil and gas reserves including RRA, and to review the disclosure requirements of Securities and Exchange Commission.

Before the problems, issues and proposed changes involving the accounting for oil and gas companies can be understood, one needs to understand the requirements of FASB No. 19 as set forth in Chapter II. The deficiency with cost-base financial statement and the methods to measure reserves begins in Chapter III. A discussion and review of the disclosure requirements by the SEC is covered in Chapter IV. Finally, the summary and conclusion are presented in Chapter V.

Full Costing Method

Another approach in accounting for oil and gas exploration is to treat the costs associated with dry holes as an element of the cost

⁶ Yuji, Ijiri, Robert M. Trueblood, "Oil and Gas Accounting - Turbulence in Financial Reporting" Financial Executive, (August, 1979), p. 24.

CHAPTER II

ACCOUNTING FOR OIL AND GAS - HISTORICAL COST METHOD

Different Accounting Methods Used Prior to FASB 19

A company spending a large amount of money may find a small quantity of oil or no oil at all. On the other hand, a huge reservoir may be found with a relatively small expenditure. In order to produce a well that will have earning potential, a company must go through a lot of trials and errors. These errors are unsuccessful efforts and result in "dry holes".

Successful Efforts Method

Traditionally, there are two alternative methods used for handling the costs of finding oil and gas. One is known as "successful efforts" (SE) costing method. The cost associated with dry holes is an expense of the period in which the expenditures are made. A cause and effect relationship between the cost incurred and the discovery of specific reserves is required.⁷ If a cost is incurred with no future benefit expected, the cost should be expensed.

Full Costing Method

Another approach in accounting for oil and gas exploration is to treat the costs associated with dry holes as an element of the cost

⁷ Philip E. Meyer, "Accounting Theory and Practice," Massachusetts CPA Review, (March - April 1978), pp. 26-7.

of discovering productive reserves. Thus, all costs are considered an integral part of the acquisition, discovery, and development of oil and gas reserves. These costs that cannot be directly related to the discovery of specific reserves are still capitalized as part of full cost of productive holes. This is called "Full costing method."

In a report submitted to the Securities and Exchange Commission in 1973,⁸ a survey of 267 oil and gas companies in the United States and Canada showed 141 using full-costing methods. This survey indicates that Canadian companies preferred to use full costing method. (See Exhibit 1 below). The reason that Canadian companies use more full costing method may be related to the fact that Canada has a higher proportion of smaller independent companies.

TABLE 1
% FULL COST METHOD TO SUCCESSFUL EFFORTS METHOD

	Total	U.S.	Canadian
Companies surveyed	297	246	51
Full-cost companies	141	106	35
Successful effort companies	156	140	16
% full-cost to total	48%	43%	69%

SOURCE: Robert E. Field, "Financial Reporting in the Oil Industry," Price Waterhouse & Co. Review, (Volume 19, 1974).

Basic Concept in Accounting Principle Under FASB 19

Generally, the incurrence of a cost that results in the

⁸ Robert E. Field, "Financial Reporting in the Oil Industry," Price Waterhouse & Co. Review, (Volume 19, 1974), p. 10.

⁹ Ibid., p. 10.

acquisition of an asset is capitalized and subsequently amortized, unless the asset becomes impaired or worthless, in which case it is reduced in value or written off. Costs that do not result in the acquisition of an asset, such as carrying costs of undeveloped properties, geological and geophysical (G & G) costs, and the costs of drilling exploratory wells that do not find proved reserves, are charged to expense when incurred.

Costs incurred to operate and maintain producing wells, related equipment and facilities, become part of the total production costs (also known as lifting costs). The other part of production costs comprise depreciation, depletion, and amortization of the costs capitalized as property acquisitions, exploration, and development costs. FASB 19 did not cover the transporting, refining and marketing aspects of oil and gas production.

Before the accounting treatment of a cost can be determined, it must be first classified as a cost of acquiring properties, exploring, developing, or producing. For example, support equipment and labor can be classified as any of the functional activities in the oil and gas industry. Labor used in developing a producing well is capitalized and subsequently amortized, whereas labor costs incurred in operating producing wells becomes part of production costs.

The following is a brief discussion of the accounting principles and basic concepts involved in each function of the oil and gas industry.¹⁰

Acquisition of Properties

Includes all costs to purchase, lease or otherwise acquire a proved or unproved property, including broker's legal, and recording fees, and other costs incurred in acquiring properties. The acquisition of properties may include the transfer of all or part of the rights and responsibilities of operating the properties (operating interest) or none of the rights or responsibilities of operating them (nonoperating interest).

Unproved properties should be reclassified to proven status when proven reserves are attributed to the property. Periodic assessment of unproved properties should be made to determine whether they have been impaired. Impairment is likely if a dry hole has been drilled and there are no future plans to continue drilling, or if the end of a lease approaches and drilling has not commenced on the property. Losses for impairment of unproved properties are made by a charge to income and a credit to a valuation account in the year the impairment occurs.

The unit-of-production method is used to amortize (deplete) all capitalized property acquisition costs of proven properties. This amortization becomes part of the production costs (lifting costs). Amortization rates should be reviewed at least annually and revisions should be accounted for prospectively as changes in accounting estimates.

In proven properties, that contain both oil and gas reserves, a common unit of measure based on the approximate relative energy content of the oil and gas should be used as the unit of production in the current period. Amortization is then based on the converted common unit of measure.

Exploration

Includes all costs relating to the search for oil and gas reserves, including depreciation and applicable costs of support equipment and facilities, drilling exploratory wells, and exploratory-type stratigraphic test wells. Exploration cost may be incurred before the actual acquisition of the property, and in this sense they are sometimes referred to as prospecting costs.

Geological, topographical, and geophysical studies (G & T costs) and related salary and other expenses are also expensed, because they do not represent the acquisition of an identifiable asset. The studies are frequently made before the acquisition of the property and represent research or information costs.

In waiting for the determination of whether a well has proven reserves, all costs of drilling exploratory wells are capitalized and are classified as incompleting wells, equipment and facilities. After the well is completed, and if the well has proven reserves, the costs are capitalized and reclassified as wells, related equipment and facilities. However, if no proven reserves are found, the capitalized costs of drilling the well, less any salvage value, is charged to expense.

The unit of production method is used to amortize all capitalized exploration costs. This amortization becomes part of the cost of production.

Development

Development costs include those incurred in creating a production

system of wells, related equipment and facilities, on proven reserves so that the oil and gas can be produced. Development costs are associated with specific proved reserves, exploration costs are associated with unproven reserves. The cost of building a road to gain access to proven reserves is a development cost, as is the cost of providing facilities for extracting, treating, gathering, and storing the oil and gas. The unit of production method is used to amortize all capitalized development costs.

Production

Includes all costs incurred in lifting the oil and gas to the surface, and gathering, treating, field processing, and field storage. Statement 19 provides that the production function terminate at the outlet valve on the leased property or the field production storage tank, or under unusual circumstances, at the first point at which the oil and gas is delivered to a main pipeline, refinery, marine terminal, or a common carrier.

Production costs include labor, fuel, and supplies needed to operate the developed wells and related equipment, repairs, property taxes, and insurance on proven properties, and wells, related equipment and facilities.

Costs incurred to operate and maintain the production system become part of the total production costs. The other part of production costs consists of the depreciation, depletion and amortization of the costs capitalized as acquisition of properties, exploration, and development costs.

Support Equipment and Facilities

Costs for support equipment and facilities may be incurred for exploration, development, or production activities. Generally, these costs are capitalized and depreciated over their estimated useful lives or the life of the lease, whichever is appropriate. The depreciation expense and related costs of operating the support equipment and facilities is charged to the related activity (exploration, development, or production). When support equipment and facilities are utilized for more than one activity, the depreciation expense and operating costs should be allocated between the activities on a reasonable basis.

Figure 1 shows the flow of costs under FASB Statement No. 19.¹¹

Effects of Different Accounting Practices

Under full costing, a company spending \$100 million to drill 10 exploratory wells only to find two wells are productive will not report a loss because all \$100 million will be capitalized as an asset. Under successful efforts costing, the company will charge 80 million as current expense because only \$20 million will be recorded as an asset. So, under successful efforts costing, there is more chance that new and small companies will report losses, because, unlike mature companies, the small company does not have a steady income from other reserves to offset the initial huge investment in exploration.¹² A company's financial

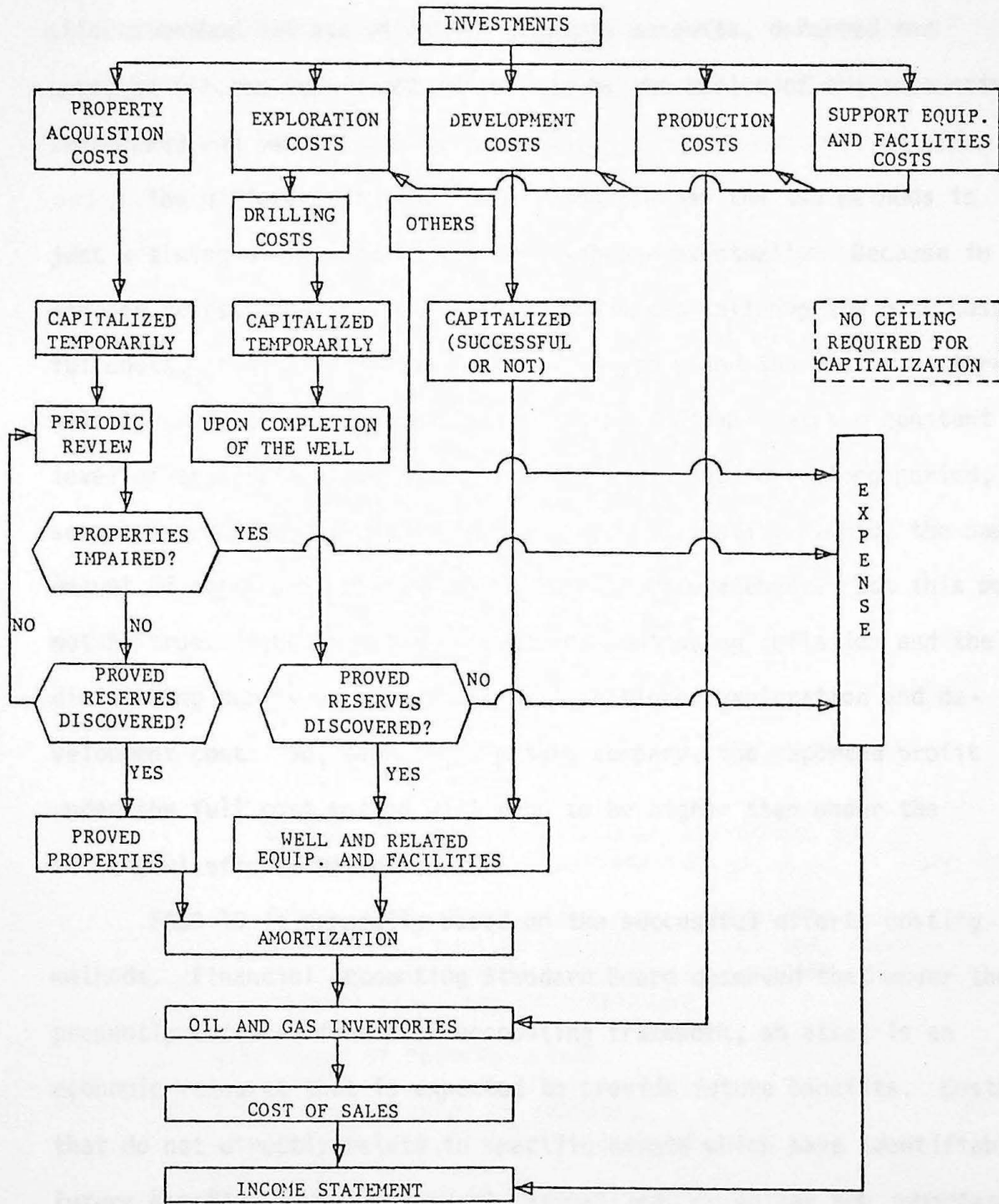
11

Yuji, Ijiri, "Oil and Gas Accounting - Turbulence in Financial Reporting," Financial Executive, (August 1979), p. 21.

12

Ibid., p. 20.

Figure 1 Flow of Costs under FASB Statement 19



Source: Yuji, Ijiri, "Oil and Gas Accounting - Turbulence in Financial Reporting." Financial Executive, (August 1979).

statement might look better under full costing than under successful efforts method because of higher property accounts, deferred tax accounts (income tax is not influenced by the choice of the accounting treatment) and owner's equity accounts.

The difference in the profit amount under the two methods is just a timing difference. It will disappear eventually. Because in earlier years, adopting full costing means capitalizing the unsuccessful costs, it will be amortized in later years and the profit picture will look worse. But for a mature company that maintains a constant level of exploration and development expenditures for a long period, it seems under either successful efforts or full costing method, the same amount of costs will be charged to the income statement. But this may not be true. Since the significant and continuing inflation and the diminishing supply of reserves result in higher exploration and development cost. So, even for a mature company, the reported profit under the full cost method will tend to be higher than under the successful efforts methods.¹³

FASB 19 is generally based on the successful efforts costing methods. Financial Accounting Standard Board observed that under the presently accepted financial accounting framework, an asset is an economic resource that is expected to provide future benefits. Costs that do not directly relate to specific assets which have identifiable future benefits normally are not capitalized, no matter how important those costs may be to the ongoing operations of the enterprise. If

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Robert E. Field, "Financial Reporting in the Oil Industry." Price Waterhouse & Co. Review, (Volume 19, 1974), p. 11.

costs do not give rise to an asset with identifiable future benefits, they are charged to expense or recognized as a loss. It rejected the full costing method because it tends to obscure the failures and risks of exploration activities by capitalizing the cost of unsuccessful efforts.

Financial Accounting Standard Board recognized that:

Neither full costing nor successful efforts costing reflects success at the time of discovery. Under both methods, success is reported at the time of sale. It might be said, therefore, that both methods tend to obscure, or at least delay, the reporting of success, but that is the consequence of the historical cost basis of accounting, and its adherence to the realization concept.¹⁴

The Board considered the following broad areas of disclosure of information regarding oil and gas reserves:

- a. Disclosure of reserve quantities.
 1. Estimated reserve quantities, by categories and types of reserves.
 2. Changes in estimated reserve quantities, by categories and types of reserves.
 3. Other disclosures relating to estimated reserve quantities, such as geographic locations, ownership characteristics, quality of reserves, and unusual risks and uncertainties.
- b. Disclosure of reserve values.
 1. Estimated value of reserves.
 2. Changes in estimated reserve values.
- c. Description of assumptions and difficulties in estimating quantities or values of oil and gas reserves.

¹⁴

FASB No. 19, Par. 152.

Reactions to FASB 19

After issuance of Statement 19, a number of oil and natural gas producers testifying at Department of Energy (DOE) hearings stressed that they oppose the adoption of FASB 19 by The Securities and Exchange Commission.

Among those opposing the statement was J. Standford Smith, chief executive officer of International Paper Company, which has an oil and gas subsidiary. Smith testified¹⁵ that for the past 15 to 20 years most public independent exploration companies used "full cost" accounting, which was developed to correct distortions caused by the successful efforts method. Smith said that a switch to successful efforts method would result in a major cutback in oil and gas exploration and reduced energy supplies, and cause serious antitrust questions because of its effects on competition. The Federal Trade Commission had joined the Department of Energy in opposing the adoption by the SEC of controversial Statement 19 raised the question of antitrust and the negative impact on the accounting earnings of those companies, would result in material fluctuation in their earnings and would limit their ability to raising capital and compete with the major companies.¹⁶

15

Kerry Cooper, Steven M. Flory, S.D. Grossman "New Ballgame for Oil and Gas Accounting," The CPA Journal, (January 1979), p. 13.

16

Robert F. Randall, "FTC Urges SEC Not to Adopt Successful Efforts Standard," Management Accounting, (July 1978), p. 9.

In August 1978, the SEC rejected FASB No. 19, stating that both cost methods were so inadequate that it did not matter which one was used.

Pointing out that only the net present values of oil and gas reserves reported in the financial statements would communicate meaningful information on assets and earnings of oil and gas producers, the SEC required new disclosure information and is trying to develop a new accounting method called "Reserve Recognition Accounting" (RRA).

futures of the extractive industry as follows:

Extractive operations are set apart from other industries by a primary focus on the search for vast, natural, mineral resources. In contrast with industries that seek to use a production process to increase economic utility by combining existing resources acquired in market exchanges, extractive industries search for natural resources with an intrinsic economic utility independent of the nature, cost, or market value of the resources used to discover them. This future of extractive operations is unique.¹⁷

Under traditional historical costing methods, neither full costing nor successful efforts method presents the most significant event of extractive operations--discovery or reserves--to the investor's attention in the financial statements. The investor is unable to compare the relative success of an oil company by looking at the financial statements alone because the value of the reserves discovered is missing. In a Symposium held on May 15 and 16, 1978, in Pittsburgh,

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Robert E. Field, "Financial Reporting in the Extractive Industries," Accounting Research Study No. 11, p. 10.

CHAPTER III

MAJOR NEW ISSUE - RESERVES

Discrepancies of Cost-based Financial Statement

In Accounting Research Study, No. 11, "Financial Reporting in the Extractive Industries." Robert E. Field summarized the unique futures of the extractive industry as follows:

Extractive operations are set apart from other industries by a common focus on the search for wasting natural mineral resource. In contrast with industries that seek to use a production process to increase economic utility by combining existing resources acquired in market exchanges, extractive industries search for natural resources with an intrinsic economic utility independent of the nature, cost, or market value of the resources used to discover them. This future of extractive operations is unique.¹⁷

Under traditional historical costing methods, neither full costing nor successful efforts method presents the most significant event of extractive operations--discovery or reserves--to the investor's attention in the financial statements. The investor is unable to compare the relative success of an oil company by looking at the financial statements alone because the value of the reserves discovered is missing. In a Symposium held on May 15 and 16, 1978, in Pittsburgh,

17

Robert E. Field, "Financial Reporting in the Extractive Industries," Accounting Research Study No. 11, p. 10.

Albert S. Martin, Jr., controller of Sun Company, Inc., explained:

In our opinion, a petroleum company's true economic success is largely measured by the current values of the mineral reserves it owns. Cost data are not useful in this respect, because in our industry there is no relationship between the cost of reserves and their values. Value data provide an insight into the qualitative differences of reserves, not otherwise discernible from a purely volumetric disclosure.¹⁸

Stanley P. Porter, Vice Chairman of Arthur Young & Company, stated that:

The frustration with cost based financial statements has been present for many years, a growing number of people believe that oil and gas reserves should be valued based on current value.¹⁹

In Accounting Series Release No. 253,²⁰ SEC rejected FASB's attempt to eliminate use of the full costing method, asserting that both full costing and successful efforts methods neglect the most significant event in exploration and development activities--the discovery of oil and gas reserves. The SEC argued that the earning process for oil and gas companies is significantly different from that of most other industries. A company may invest huge sums of money in exploration and find no oil at all while other companies may spend a small sum of

¹⁸ Yuji, Ijiri, "Oil and Gas Accounting - Turbulence in Financial Reporting," Financial Executive, (Aug. 1979), p. 23

¹⁹ Ibid., p. 23. Flory, and S.D. Grossman, "New Ballgame for Oil and Gas Accounting," CFA Journal, (January 1979), p. 14.

²⁰ Accounting Series Release No. 253 (Washington, D.C.: SEC, 1978). Accounting Series Release No. 257, (December 1978).

money and strike a rich reservoir. In addition, the marketability of the discovered reserves seems relatively assured at present. Therefore, the SEC believes that it will be justified to depart from the realization principles for the oil and gas producers in order to report more meaningful financial statements.²¹

Definition of Oil and Gas Reserves

The Financial Reporting System of the Department of Energy had developed the following definitions of proven reserves which were adopted by the Securities and Exchange Commission on December 19, 1978 in ASR No. 257:

Proved oil and gas reserves are the estimated quantities of crude oil, natural gas, and natural gas liquids which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions, i.e., prices and costs as of the date the estimate is made. Prices include consideration of changes in existing prices provided only by contractual arrangements, but not on escalations based upon future conditions.²²

Proved reserves are classified into (a) proved developed reserves and (b) proved undeveloped reserves.

Proved developed reserves are those which can be expected to be recovered through existing wells using existing equipment and operating

21

K. Cooper, S. Flory, and S.D. Grossman, "New Ballgame for Oil and Gas Accounting," CPA Journal, (January 1979), p. 14.

22

Accounting Series Release No. 257, (December 1978).

methods. Proved developed reserves may be further classified into:

- (1) Proved developed producing reserves which are those where production is expected from existing wells.
- (2) Proved developed nonproducing reserves which are those which exist behind the casings of existing wells, or at minor depths below the bottom of existing wells, which are expected to be produced through these existing wells in the predictable future. In addition the costs of extracting oil and/or gas from proved developed nonproducing reserves should be considered less than the cost of a new well.

Proved developed reserves include oil and/or gas expected to be recovered by improved techniques (fluid injection), but only after testing by a pilot project has confirmed that increased production will occur.

Proved undeveloped reserves are those where oil and gas is expected to be recovered from new wells on undrilled acreage, or from existing wells that require major expenditures for completion. Proved undeveloped reserves represent acreage in which it is reasonably expected that oil and/or gas will be produced when drilled.²³

Uncertainties in Reserve Estimates

By definition, proven reserves are estimates. To develop these

²³

ASR No. 257.

estimates requires the judgment of persons trained and experienced in reservoir engineering.

Reserves are calculated before wells are drilled; generally, it is based on what the geologist thinks of potential reservoir thickness, areal extent, depth of reservoir. The accuracy is heavily dependent upon reliable geological and well information along with the experience of the geologist and reservoir engineer.

A study made by Joseph E. Connor²⁴ indicated that the accuracy of discovery date estimate of reserve quantities frequently ranges from ± 15 per cent to ± 85 per cent or more. The consensus was that the discovery date quantity estimates were inaccurate by at least ± 50 per cent. The petroleum engineering consultant firm, DeGiloyer and MacNaughton, stated that after discovery, it will take at least five years before quantity estimates can be made within a ± 20 per cent error range. That means it takes at least five years to develop production history, areal extent, porosity, permeability, and production drive mechanism.

Reserves estimates from two engineers of equal capability can deviate significantly to reach a materially different data. Although sometimes the engineers agree with the quantities, they will disagree as to whether such quantities were producible under existing economic and operating conditions--criterion under ASR No. 257. So the estimates of the quantity of reserves generally are highly uncertain and subject

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Joseph E. Connor, "Reserve Recognition Accounting: Fact or Fiction?", Journal of Accounting, (September, 1979), p. 95.

to major revision.²⁵

Table 2 is a typical actual revisions reported by a number of experts in the fields of geology, engineering and economics.

The range of reserve changes will cause wide fluctuations in the present value of the expected net cash inflows at time 0 for any particular discovery. However, under certain circumstances as the number of discoveries increase, the realized mean of the present value of the net cash inflows on the total discoveries will converge on the expected mean value.²⁶

An analysis conducted by Welsh concluded that a company with a moderate number of fields that have a good production history should be able to obtain reasonably good estimates of the total quantity of reserves held at a given time.²⁷

Methods for Reserve Measurements

In the preceding paragraph, the large variances of reserve quantities has been discussed. When the reserves are converted to dollar value, the complication will go deeper. The most common estimated valuation methods are:²⁸

25

Ibid., p. 95.

26

Glenn Welsh, Edward B. Deakin, "Measuring and Reporting the Replacement Cost of Oil and Gas Reserves," (1977) p. 6.

27

Ibid., p. 7.

28

FASB Discussion Memorandum, Paragraphs 436-466.

TABLE 2

CASE STUDIES OF ACTUAL RESERVE ESTIMATES
(millions of barrels)

Pool	Discovery Date	First Estimate		Second Estimate		Percentage Change ³
		Date	Quantity	Date	Quantity	
West Edmond Hunton Oklahoma	1943	1946	180	1966	105	-42
Redwater Alberta	1948	1952	684	1966	817	19
Sacroc-Helly Snyder ¹ Texas	1948	1950	750	1960	1,472	96
Coalinga Nose California	1938	1953	506	1966	475	-7
Sholem Aleehem Oklahoma	1947	1955	78.3	1966	78.3	0
Lansing-Kansas City ² Kansas	1949	1960	1.2	1966	1.4	17
Northeast Jones Field ² Oklahoma	1945	1951	4.7	1966	5.2	11
Sloss Unit Nebraska	1954	1958	15.2	1966	14.8	-3
Totals			<u>2,219.4</u>		<u>2,968.7</u>	

SOURCE: Keplinger, 1967 Southwestern Legal Foundation Conference.

¹ Reflects effect of unitization.

² Reflects effect of secondary recovery.

³ $(105-180) \div 180 = -42\%$.

1. Current cost - the amount of cash that currently would have to be paid to acquire the same asset. Similar to current re-production cost or current replacement cost.
2. Current exit value in orderly liquidation - the net amount of cash that would be received in the current orderly liquidation of the asset.
3. Expected exit value in due course of business - the nondiscounted amount of cash the asset is expected to bring in the due course of business, less any direct costs incurred in its disposal (net realizable value). Under this method the oil and/or gas reserves would be valued at an amount equal to the estimated net cash flow from the present value of expected cash flows.
4. The present value of expected cash flows is the present value of future cash inflows into which an asset is expected to be converted in the due course of business, less the present value of cash outflows necessary to obtain these inflows. Present value measurements require information about estimated amounts of future cash inflows and outflows, the timing of those expected cash flows, and the appropriate discount rate. Various discount rates have been recommended, such as the prime rate, company's cost of capital, and the rate of long-term government bonds.

A research study sponsored by American Petroleum Institute was reported in Measurement and Reporting the "Replacement" Cost of Oil and Gas Reserves by Glenn A. Welsch and Edward B. Deakin, published in July 1977. The research team identified several approaches in measuring replacement cost of a reserve, indexed historical costs, prospective replacement costs, recent exploration and development costs in the industry, direct market exchange price of reserves underground, direct market-exchange price of hydrocarbons above ground, and the recent exploration and development costs for a company. After a careful examination of these approaches, the project team rejected all of

them and selected the equivalent purchase cost.

The research study stated:

Due to the infrequency of market transactions for oil and gas reserves and the difference in reserve characteristics from one location to another, it is not possible to compute an equivalent purchase cost by direct reference to market transactions. However, a standard procedure for estimating the purchase price that would be paid in a market transaction is widely used in the oil and gas industry. This procedure involves estimating the production from a field (or a group of fields), then multiplying that production estimate by the expected net cash inflow per barrel of oil or per thousand cubic feet (mcf.) of gas, and then discounting those projected cash inflow to derive what a typical purchaser would pay for reserves.²⁹

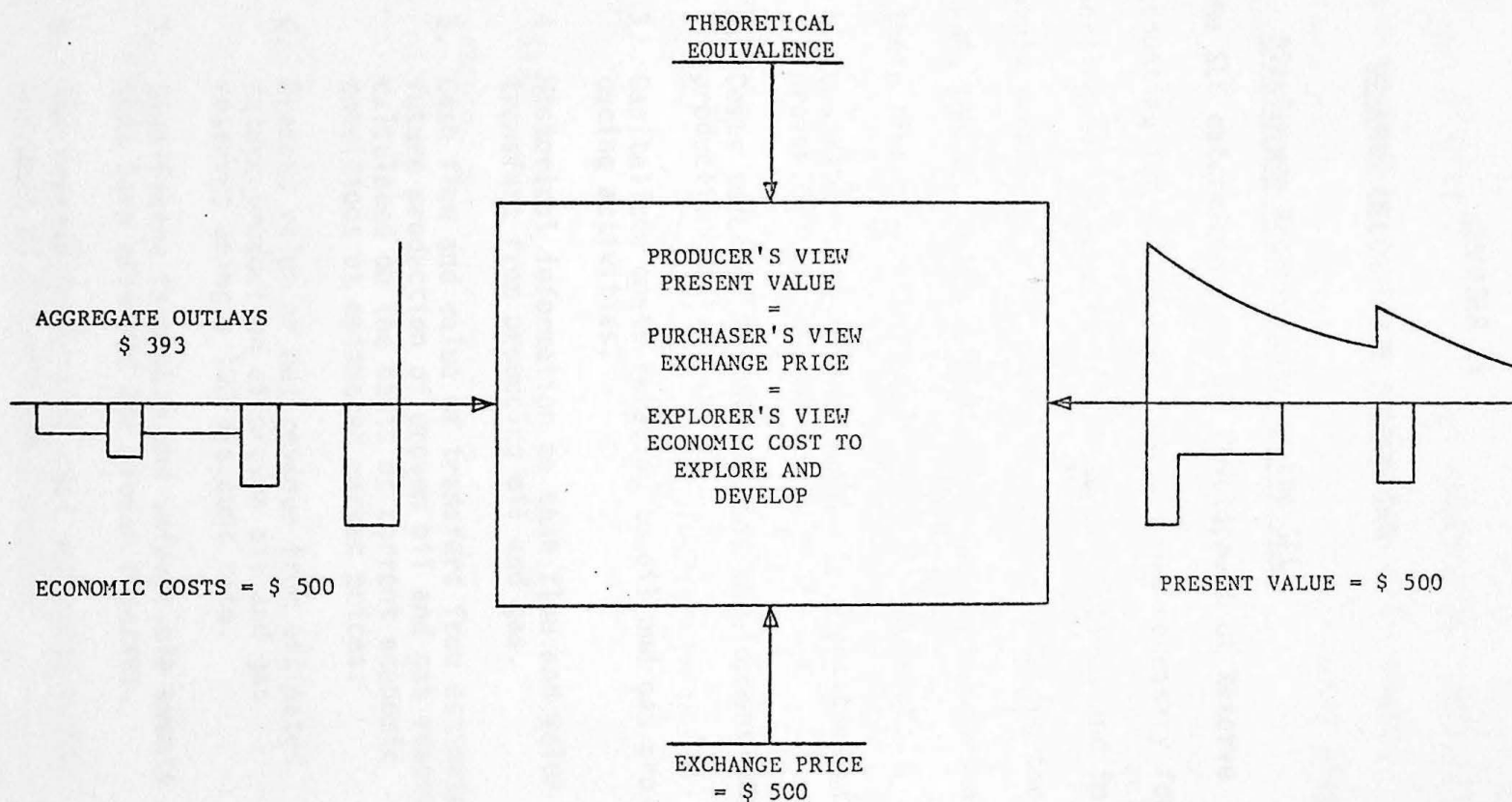
Figure 2 shows three-way theoretical equivalence between the purchaser, explorer, and producer reflects an economic indifference point when the three parties are the same entity or when they have similar expectations about the future and have equivalent tax liabilities.

Although the research conclusion of this study was not supported by American Petroleum Institute, the present value concept was accepted by SEC. In August 1978, the SEC issued Accounting Series Release No. 253 requiring disclosure of present value of estimated future net revenues from proved reserves as supplemental information and proposed to develop Reserve Recognition Accounting under which reserves are valued at present value concept.

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Glenn Welsch, Edward B. Deakin, "Measuring and Reporting the Replacement Cost of Oil and Gas Reserves", (Research Study sponsored by American Petroleum Institute, 1977), p. 6.

Figure 2 Theoretical Equivalence of Methods



Source: Glenn Welsh, Edward B. Deakin, "Measuring and Reporting the Replacement Cost of Oil and Gas Reserves," (Research Study Sponsored by American Petroleum Institute, 1977).

CHAPTER IV

RESERVE RECOGNITION ACCOUNTING

Disclosure Requirements by the SEC

While the SEC determined that the development of Reserve Recognition Accounting for oil and gas industry was necessary for meaningful reporting, it recognized that such development and implementation would require several years to achieve. During the transition of RRA, the SEC proposed that oil and gas producers are to supplement their financial statements with disclosure of:

1. Quantities and annual changes in quantities of proven oil and gas reserves.
2. Costs incurred in exploration, development and production activities.
3. Capitalized costs relating to oil and gas producing activities.
4. Historical information on cash flow and value of transfers from producing oil and gas.
5. Cash flow and value of transfers from estimated future production of proven oil and gas reserves, calculated on the basis of current economic conditions at estimated market prices.
6. Present value of net revenue from estimated future production of proven oil and gas reserves using a 10% discount rate.
7. Significant favorable and unfavorable events that have affected the proven reserves.
8. The average production cost and sales price per unit of oil and gas produced.

9. Historical information on the number of productive and dry wells drilled.³⁰

In addition, originally the SEC had proposed to require oil and gas producers to prepare earnings summary based on reserve recognition accounting to supplement the financial statement after December 25, 1979.

Excerpts of illustrative financial statement disclosures as audit and accounting guide, oil and gas reserve information required by Regulations S-X, developed by Committee of the American Institute of CPA's are shown in Tables 3 and 4.³¹

Supplemental earnings summary is shown in Table 5.³²

Under RRA, revenues are sales and transfers of produced oil and gas and current additions to proven reserves; expenses consist of costs of production, cost of addition to properties, any revisions in addition to proven reserves would also be included in the RRA earnings summary.

Valuation Method Prescribed by the SEC

The SEC proposed valuation method as follows:

30

Kerry Cooper, Steven Flory, and J.C. Groth, "Reserve Recognition Accounting: A Proposed Disclosure Framework," The Journal of Accountancy, (September 1979), pp. 82-83.

31

Ibid., pp. 84-86.

32

Ibid., p. 87.

TABLE 3

ESTIMATED PROVEN RESERVES OF OIL AND GAS AS OF DECEMBER 31, 19XX*

	Total worldwide		United States		Foreign geographic area A		Foreign geographic area B		Other foreign geographic areas	
	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas
Proven developed and undeveloped reserves										
Beginning of year	X	X	X	X	X	X	X	X	X	X
Revisions of previous estimates	X	X	X	X	X	X	X	X	X	X
Improved recovery	X	X	X	X	X	X	X	X	X	X
Purchases of minerals-in-place	X	X	X	X	X	X	X	X	X	X
Extensions, discoveries and other additions	X	X	X	X	X	X	X	X	X	X
Production	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Sales of minerals-in-place	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
End of year	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
Proven developed reserves										
Beginning of year	X	X	X	X	X	X	X	X	X	X
End of year	X	X	X	X	X	X	X	X	X	X
Oil & gas applicable to long-term supply agreements with foreign governments or authorities in which the company acts as producer										
Proven reserves at end of year	X	X			X	X	X	X	X	X
Received during the year	X	X			X	X	X	X	X	X

TABLE 3
(continued)

ESTIMATED PROVEN RESERVES OF OIL AND GAS AS OF DECEMBER 31, 19XX*

	Total worldwide		United States		Foreign geo-graphic area A		Foreign geo-graphic area B		Other foreign geographic areas	
	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas
Company's proportional interest in reserves of investees accounted for by the equity method, end of year	X	X	X	X	X	X	X	X	X	X

*Oil reserves, which include condensate and natural gas liquids, are stated in barrels, and gas reserves are stated in thousands of cubic feet.

SOURCE: Exposure draft dated April 13, 1979, the Oil and Gas Reserve Data Committee of the American Institute of CPA.

Equity investees
(proportional shares)

Notes for present value of estimated future net revenues:

1. Oil prices used were based on prices as December 31, 19X1, and 19X0, with no escalation. Gas prices used were based on current contracts adjusted for contractual escalations.
2. Development and production costs were estimated on the assumption that existing economic conditions will continue.
3. A 10% discount rate was used.
4. Income tax effects were not considered.

SOURCE: Exposure draft dated April 13, 1979, the Oil and Gas Reserve Data Committee of the American Institute of CPA.

TABLE 4

PRESENT VALUE OF ESTIMATED FUTURE NET REVENUE FROM PROVEN RESERVES OF OIL AND GAS

	Total worldwide		United States		Foreign geo- graphic area A		Foreign geo- graphic area B		Other foreign geographic areas	
	Dec. 31,		Dec. 31,		Dec. 31,		Dec. 31,		Dec. 31,	
	19X1	19X0	19X1	19X0	19X1	19X0	19X1	19X0	19X1	19X0
Proven developed and un- developed reserves										
Added in previous years	\$ X	\$ X	\$ X	\$ X	\$ X	\$ X	\$ X	\$ X	\$ X	\$ X
Added during current year	X	X	X	X	X	X	X	X	X	X
Total end of year	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>
Proven developed reserves	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>
Long-term supply agree- ments with foreign governments (company operated)	<u>\$ X</u>	<u>\$ X</u>			<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>
Equity investees (proportional share)	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>	<u>\$ X</u>

Basis for present value of estimated future net revenue:

- 1 Oil prices used were based on prices at December 31, 19X1, and 19X0, with no escalation. Gas prices used were based on current contracts adjusted for contractual escalations.
- 2 Development and production costs were estimated on the assumption that existing economic conditions will continue.
- 3 A 10% discount rate was used.
- 4 Income tax effects were not considered.

SOURCE: Exposure draft dated April 13, 1979, the Oil and Gas Reserve Data Committee of the American Institute of CPA.

TABLE 5

SEC PROPOSED FORMAT OF THE SUPPLEMENTAL EARNINGS SUMMARY OF
OIL AND GAS PRODUCING ACTIVITIES YEAR ENDED DECEMBER 31, 19XX

Revenues from oil and gas		
Sales to outsiders	\$XXXX	
Transfers	XXXX	\$XXXX
Costs of production		
Lifting costs	XXXX	
Amortization of proven properties	XXXX	(XXXX)
Income from producing activities		<u>XXXX</u>
Current additions to proven properties discovery		XXXX
Costs of additions to proven properties cost		
Exploration costs	XXXX	
Development costs	XXXX	(XXXX)
Income from current exploration and development activities		<u>XXXX</u>
Revisions to previous additions to proven properties		
Changes in estimated quantities of proven reserves		XXXX
Changes in rate of production		XXXX
Changes to reflect current prices and costs		XXXX
Holding gains from passage of time		<u>XXXX</u>
Total revisions		<u>XXXX</u>
Profit contribution from oil and gas producing activities before income taxes		XXXX
Provision for income taxes		<u>(XXXX)</u>
Profit contribution from oil and gas producing activities after income taxes		<u><u>\$XXXX</u></u>

SOURCE: Exposure draft, April 13, 1979, the Oil and Gas Reserve
Data Committee of the American Institute of CPA.

Richard L. American, "Oil Reserve Recognition Accounting Work"
Journal of Accountancy, December, 1981, p. 74.

- a. Based on existing economic conditions, estimate the timing of future production of proven reserves.
- b. Use balance sheet date prices of oil and gas to compute future revenue.
- c. Deduct the costs to develop and produce the proven reserves estimated on the basis of year end cost levels to arrive at future revenue amount.
- d. The present value of future net revenues from producing proven reserves is to be calculated using a 10 per cent discount rate.³³

The required use of current cost-price conditions for reserve valuations are based on the arbitrary assumption that production costs and selling prices will move in the same direction. In fact, selling prices are more likely to be influenced by the decision of the Organization of Petroleum Exporting Countries, by the U.S. Government control and by various demand factors than by production costs. Political considerations, rather than economic ones, will have the major influence on what those prices should be.

The required 10 per cent discount rate seems very arbitrary. The discount rate should reflect the mixed factors such as time value of money, the business risk, the financial risk and the information risk.³⁴ The risks both vary among companies during certain periods of

³³ William C. Worby, "Reserve Recognition Accounting for Oil and Gas Reserves" *Financial Analysts Journal*, (January - February 1979), p. 10. Accounting Series Release 253, (August, 1978).

³⁴ Richard C. Adkerson, "Can Reserve Recognition Accounting Work?" *Journal of Accountancy*, (September, 1979), p. 79.

time. According to APB Opinion, No. 21, the choice of a discount rate may be affected by the credit rating of the issuer, restrictive covenants, the collateral, payment and other terms pertaining to the debt, and the tax consequences to the buyer and seller. The objective should be to approximate the rate which would have resulted if an independent borrower and an independent lender had negotiated a similar transaction under comparable terms and conditions with the option to pay the cash price upon purchase or to give a note for the amount of the purchase which bears the prevailing rate of interest to maturity.

The discount rate applied to future streams of income could be changed with changes in market rates, but the Financial Accounting Policy Committee recommended using one rate to prevent manipulation of this sensitive valuation factor. The oil and gas companies argue that it is unrealistic to use the same rate for all companies, or for both North Sea reserves and for those in Texas; the resulting data would be so simplistic as to lose all significance.³⁵

The SEC has proposed annual revision of the valuation of reserves under (a) changes in estimated quantities, (b) changes in the rate of estimated future production, (c) changes in prices and costs and (d) holding gains over time.³⁶ These four factors are inter-related. Under RRA, discovery values are not the only revenue amount

³⁵ William C. Norby, "Reserve Recognition Accounting for Oil and Gas Reserves" Financial Analysts Journal, (January - February 1979), p. 10.

³⁶ Richard C. Adkerson, "Can Reserve Recognition Accounting Work?", Journal of Accountancy, (September, 1979), p. 78.

shown on income statement. The total of annual revision of reserve valuation may exceed income from discoveries. Some companies may try to manipulate income by arbitrary revision of reserve quantities. Price revision resulting from the required use of current prices for RRA valuations purpose may greatly exceed discovery income.

Foreign Reserves

Interest in foreign reserves may be broadly classified as service agreements, participation agreements, and equity agreements. In a country title to reserves or to production from them is subject to the conditions specified by the host country. In some countries, due to the political instability, contracts are not honored. In those countries with unstable political situations, the cost reported should not exceed the expected net realizable value of those reserves. Many foreign governments prohibit disclosure of reserves quantities and valuation information. The petroleum companies and foreign governments may enter into different concession agreements, which would require different accounting recognition. For example, one company operates in Country X, the other in Country Y. Country X was granted the requisite interest to permit classification of discoveries as proven reserves. The concession from foreign Country Y does not have such interest, but is the same long-term supply contract. Both companies' future cash flow are equally dependent on production of oil and gas discovered. Company operating in X Country will recognize RRA income on discovery. Company in Y Country would recognize income only on production.³⁷

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Joseph E. Connor, "Reserve Recognition Accounting: Fact or Fiction?" Journal of Accountancy, (September 1979), p. 98.

Auditor's Consideration

Valuation of reserves is based on estimates made by engineers of the quantity of an oil or gas company's reserves. Their technique has progressed considerably over the years, but it still lacks the degree of accuracy one would normally associate with financial statement.

It is considered quite accurate if a reserve estimate falls within 5 to 10 per cent of reality. When millions of barrels of oil are involved, 5 to 10 per cent may seem insignificant, but under RRA, the entire financial statement would depend on the reserves estimated, even a relatively small inaccuracy could substantially distort a company's earning figures.

The history of reserves estimated and later revisions makes an auditor feel uncomfortable. Many oil and gas companies have been forced to take millions of dollars of write-offs when reserves proved to be smaller than anticipated.

The auditor is caught between investor's desire for more meaningful financial statements and the public's expectations that financial statements are invariably accurate. The AICPA's Auditing Standards Executive Committee is currently grappling with the problem, re-evaluating standards for the profession on when and to what extent auditors can rely on data provided by other professionals.

Now, ASR No. 269 requires a "Supplemental RRA Summary" to show a company's success in finding new reserves. RRA information will be covered by a safe harbor rule to protect producers from liability

if the information is disclosed in good faith and has a reasonable basis.³⁸ For calendar year 1979 or fiscal 1980 year-ends, SEC requires that RRA Summary must be included in Form 10-K but not in the annual shareholders report, and it need not be comparative. The summary may be marked "unaudited," but auditor must perform a review of data.

In order to analyze reactions to the usefulness of certain information regarding reserve quantities and estimated future net revenues from proved reserves of oil and gas, Peat, Marwick, Mitchell & Co.³⁹ conducted a survey in August, 1979 among members of the National Association of Petroleum Investment Analysis. Of the respondents, who would be among the key users of oil and gas reserve information, 80 per cent indicated that RRA should not be substituted for historical cost information. 90 per cent agreed that reserve information would help them in their analyses. 54 per cent said Supplemental Earnings Summary will be of significant value to them.

From the above survey, the SEC's proposed RRA method to substitute historical costing method is not favored by petroleum investment analysts.

Hypothetical Illustration

The following example is simplified to compare H company's

³⁸

News Report, Financial Executive, (December, 1979), p. 11.

³⁹

"Oil and Gas Analysts Oppose Historical Cost/RRA Switch"
Executive Newsletter, Peat, Marwick, Mitchell & Co. (October 5, 1979),
p. 2.

balance sheet and income statement under historical cost (successful efforts) method and RRA method.

Hypothetical Data:

Beginning of year

Proven reserves 500,000 barrels will produce
at a rate of 100,000 barrels per year
Capitalized costs \$1.5 million, 1/5 will be
expensed this year.

Current year

Drill 4 wells, each cost \$500,000:
2 Unsuccessful 2 x \$500,000 = \$1,000,000
2 Successful 2 x \$500,000 = \$1,000,000, each
will produce 100,000 barrels of oil at a
rate of 20,000 barrels per year.

Sales and production

Sales:

Old wells - 100,000 barrels at \$14 per barrel

Production cost = 7.5% of gross revenue
that is $(\$14 \times 100,000) \times 0.075 = \$105,000$ ⁴⁰

Table 6⁴¹ shows balance sheet and income statement prepared under historical cost (successful efforts) accounting method.

Table 7⁴² shows balance sheet and income statement prepared under RRA concept (simplified). Under RRA, oil reserves as discounted is using 10 per cent discount rate to calculate the present value of net revenue from proven reserves. SEC specified use current oil prices

⁴⁰

Lyn M. Fraser, "RRA, A Look Behind the Theory to Numbers," Journal of Accountancy, (September, 1979), p. 107.

⁴¹

Ibid., p. 108.

⁴²

Ibid., p. 109.

TABLE 6

HYPOTHETICAL PETROLEUM COMPANY
(Successful Efforts Method)

Balance sheet at end of current year (conventional)

<u>Assets</u>	
Current assets	\$ 400,000
Oil properties ¹	2,200,000
Other assets	<u>600,000</u>
Total assets	<u>\$3,200,000</u>
<u>Liabilities and stockholders' equity</u>	
Current liabilities	\$ 360,000
Long-term debt	<u>1,100,000</u>
Total liabilities	1,460,000
Common stock (\$2 par)	
200,000 shares outstanding	400,000
Paid-in capital	500,000
Retained earnings	<u>840,000</u>
Total stockholders' equity	1,740,000
Total liabilities and stockholders' equity	<u>\$3,200,000</u>

Income statement for current year (conventional)

Revenue:	
100,000 barrels @ \$14	\$1,400,000
Expenses:	
Production costs	\$ 105,000
Depletion ²	300,000
Depreciation	200,000
Exploration and development ³	1,000,000
Other expenses	<u>65,000</u>
Net income before tax	\$ 1,670,000
Per share	\$(270,000)
	\$(1.35)

Notes:

¹ Capitalized costs at beginning of year	1,500,000	
Less: Depletion (.20 x \$1,500,000)	<u>300,000</u>	\$ 1,200,000
Capitalized costs of successful wells, current year		<u>1,000,000</u>
Total		\$ 2,200,000

² 20% x \$1,500,000 = \$300,000

³ Expenses cost of two unsuccessful wells at \$500,000 per well = \$1,000,000

SOURCE: Lyn M. Fraser, Journal of Accountancy, September 1979.

TABLE 7
 HYPOTHETICAL PETROLEUM COMPANY
 (RRA)

<u>Balance sheet at end of current year (RRA)</u>		
<u>Assets</u>		
Current assets	\$ 400,000	
Oil Properties ¹	6,068,000	
Other assets	600,000	
Total assets	<u>\$ 7,068,000</u>	
<u>Liabilities and stockholder's equity</u>		
Current liabilities	\$ 360,000	
Long-term debt	1,100,000	
Total liabilities	<u>1,460,000</u>	
Common stock (\$2 par)		
200,000 shares outstanding	400,000	
Paid-in capital	500,000	
Retained earnings	4,708,000	
Total stockholders' equity	5,608,000	
Total liabilities and stockholders' equity	<u>\$7,068,000</u>	
<u>Income statement for current year (RRA)</u>		
Revenue:		
100,000 barrels @ \$14	\$1,400,000	
Net additions to proven reserves ²	<u>1,160,000</u>	\$2,560,000
Expenses:		
Production costs	105,000	
Depreciation	200,000	
Exploration and development ³	2,000,000	
Other expenses	<u>65,000</u>	2,370,000
Net income before tax		190,000
Per share		<u>\$.95</u>

Notes:

¹ Oil properties based on present value of net revenues from proven reserves $\$1,400,000 - \$105,000 = \$1,295,000$
 $\$1,295,000 \times$ present value factor, ordinary annuity,
 10%, 4 periods = $\$4,105,000$
 $\$ 560,000 - 42,000 = \$518,000$
 $\$ 518,000 \times$ present value factor, ordinary annuity,
 10%, 5 periods = $\$1,963,000$
 $\$6,068,000$

² Present value of net revenue or proven reserves, beginning of year = $\$1,295,000 \times$ present value factor, ordinary annuity, 10% 5 periods $\$4,908,000$
 Present value of net revenue of proven reserves, end of year $\$6,068,000$
 (see note 1) Net addition to proven reserves $\$1,160,000$

³ Includes all exploration and development costs, both successful and unsuccessful. ($\$500,000 \times 4$)

SOURCE: Lyn M. Fraser, Journal of Accountancy, September 1979.

(\$14 per barrel in this example) under RRA income statement, in addition to sales, revenue would include net addition to proven reserves, and all exploration and development cost should be expensed whether successful or not.

Table 8⁴³ shows the major differences between historical cost method and RRA. RRA has larger assets--oil properties because present value of proven reserves is reflected on balance sheet. Consequently, the stockholder's equity account is also greater. RRA Income Statement recognizes the net increase in proven reserves as revenue, all exploration and development costs are expensed.

This example is simplified for illustration purposes only; the real situation will be much more complicated.

TABLE 8

HYPOTHETICAL PETROLEUM COMPANY

<u>Differences in balance sheet and income statement items</u> <u>Conventional and Reserve Recognition Accounting</u>		
	<u>Conventional</u>	<u>RRA</u>
Oil properties	\$2,200,000	\$6,068,000
Total stockholders' equity	1,740,000	5,608,000
Equity per share	8.70	28.04
Revenue	1,400,000	2,560,000
Expenses	<u>1,670,000</u>	<u>2,370,000</u>
Net income (loss) before tax	\$(270,000)	\$ 190,000
Income (loss per share)	\$(1.35)	\$.95

SOURCE: Lyn M. Fraser, Journal of Accountancy, September 1979

⁴³Ibid., p. 109

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

When the Financial Accounting Standards Board issued its statement No. 19, it stirred a controversy that may be unparalleled in the industry of private sector writing of accounting principles. Statement No. 19 mandated that oil and gas companies account for their exploration drilling costs on the successful-efforts method, which effectively precludes capitalization of unsuccessful exploratory drilling costs.

The independent exploration and development companies could be badly hurt at the earnings-per-share level by successful-efforts accounting because of the expensing of unsuccessful exploratory drilling. That is why so many of the independents object to successful-efforts accounting.

At the SEC's oil and gas hearings, many of the witnesses agreed that the most meaningful method of accounting for oil and gas companies activities was through the valuation method rather than full-costing or successful-efforts accounting. The oil and gas industries are different from other manufacturing businesses. Their real assets are not plant and equipment, but the reserves of oil and gas. The most important consideration is how present reserves will translate themselves into future flow of earnings.

Valuation accounting is a major departure from the historical cost basis on which financial statement and financial reporting are based today. The SEC required supplementary use of valuation data will serve as the oil and gas industries equivalent of manufacturing companies replacement cost data.

Conclusions

A conclusion drawn from a research study conducted by the petroleum industry service group of Price Waterhouse & Co. found that:

1. The theoretical viability of RRA is critically impaired by the reality of the inherent impression of initial estimates of reserves and future development and production activities.
2. RRA will not facilitate the development of a reliable energy data base. While some of the imperfections of RRA may be lessened sufficiently to permit comparability between reporting entities, there are fundamental and irreparable flaws that raise serious questions as to the meaningfulness of the reported information.
3. RRA valuation and disclosure problems associated with foreign reserves appear insurmountable.
4. If RRA becomes the primary method of financial reporting, its enumerated short comings will not only take on greater significance but also will be compounded by additional

computation, presentation and utilization difficulties.⁴⁴

In the letter from Price Waterhouse to the SEC Price Waterhouse stated the following overall conclusion:

The findings of our study clearly demonstrate the present inability to estimate reserve quantities, future costs and production rates with a degree of reliability appropriate for financial statement presentation.

We do not oppose continued testing of RRA and other value oriented concepts. However, such testing should be done apart from publicly reported financial statements until additional experimentation demonstrates that estimation techniques are sufficiently reliable to permit presentation of meaningful information. Accordingly, we have concluded that the SEC should not, as a responsible exercise of its regulatory authority, require the publication of RRA data at this time.⁴⁵

Many accountants think that information included in RRA is relevant to financial statement users. The proposed RRA would need considerable subjective judgment relating to the estimation and valuation of proven reserves. At present, a prudent solution would seem to be supplemental disclosure of RRA financial data along with historical cost financial statement rather than full substitution.

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Joseph E. Connor, "Reserve Recognition Accounting: Fact or Fiction?", Journal of Accountancy, (September, 1979), p. 94

45

Ibid., p. 98.

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