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Special Report: Financing Independent Operations



Fair Market Value Is Goal Of Property Appraisal

By John B. Gustavson

BOULDER, CO.—An independent operator is frequently faced with the necessity of estimating the value of a property. This may be in connection with an impending sale of his own property, or it may be as part of an acquisition. Occasionally, the need for appraisal may also arise if undeveloped properties are available, and an operator wants to estimate the fair market value of the property once he has successfully developed it.

In such cases, as well as others, the need is to estimate the so-called fair market value, even though there may be relatively little information available, as is often the case when the property is operated by someone else.

In contrast to real estate, where independent appraisals are frequently used, the oil and gas industry does most of its appraising in house. This may be because the real estate industry has been around for thousands of years while the oil and gas industry can count only one century. Conversely, the reason may be that the intricacies of the oil and gas business are such that outside assistance is rarely relied on.

In any case, to estimate the value of a property requires a solid look at the property itself, and simultaneously a careful research of the market for comparable properties. This article discusses some of the most commonly used approaches to appraisal, and highlights the factors and coefficients used to estimate fair market value. Likewise, some of the sensitivities of the various methods will be discussed, and the most common pitfalls will be pointed out.



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Fair Market Value

The appraisal literature has for years discussed the pros and cons of various definitions of fair market value. There is concurrence, however, that the definition should be related to a hypothetical market transaction for the property in question, and should relate the value of that property to a cash or cash equivalent consideration. Equity shares in small public companies will clearly not count.

Also, the transaction must be among willing parties; so, for example, cases of distress sales as a result of defaulting on

bank loans would eliminate such transactions from consideration. Likewise, when reviewing comparable transactions, the parties should be independent of each other and also have knowledge both of the property itself and of the market. In short, this definition, which has been tested numerous times in court cases involving oil and gas properties, is not different from the definition of fair market value when related to real estate.

Highest And Best Use

Common to all appraisal is the necessity to first determine the highest and best use of a property. The highest and best use of a property refers to the use on the date of the appraisal, or a use which is so reasonably likely in the near future that this potential would affect the property's market price.

With this in mind, it becomes clear that an oil property will have substantially different "highest and best uses," depending on its stage of development. Clearly, the highest and best use of a producing oil property is to produce income from the sale of production. Likewise, on the other end of the development spectrum, the highest and best use of "goat pasture," or rank wildcat acreage, is the bonuses and rentals that property will bring to the landowner. Between these two extremes, properties may be non-producing, although the reserves may be proven, or the property may be a prospect defined by seismic, by subsurface control, or by other means.

The highest and best use of a non-producing property can still be related to the ability to produce income, since such



TABLE 1

Pros & Cons of Appraisal Methods

	<u>ADVANTAGE</u>	<u>DISADVANTAGE</u>
Prior Sales	• Excellent market data	• Rarely found
Comparable Sales	• Good Market • Applicable to all uses	• Research expensive
Income Approach	• Reliable for producing fields • Applicable to raw acreage	• Marginally useful for undeveloped properties
Cost Approach	• Excellent for downstream assets • Useful for exploration projects	• Inapplicable for reserves

income may be reasonably close in the future. On the other hand, a prospect cannot be considered to be anywhere near income production, partially because there is a very substantial question with regard to actual discovery of reserves, and partially because the timing of drilling may be impossible to determine.

On the basis of the highest and best use of a property, an operator can then apply that appraisal method which best suits the property. Table 1 shows the four methods which provide the most reliable estimates of value.

Appraisal Methods

Appraisals of oil and gas properties differ widely from real estate appraisals when it comes to selecting which approach to use. Four appraisal methods are standard in practically all types of appraisal—real estate as well as oil and gas: the prior sale, comparable sales, the income approach, and the cost approach.

The prior sale approach relates to a relatively recent sale of the identical property. This may be great in the case of real estate which changes relatively little from time to time, but every operator knows that an oil property changes rapidly as time goes by because of depletion and other factors.

Therefore, it is rare that an operator is able to use this approach. Occasionally a different working interest in a property may have been sold, and consequently an extrapolation may be made to the property in question. In other cases, a public oil company may have been totally dependent on a specific property, and consequently the movement of its shares on the stock market may provide information about the property, but of course, with less accuracy.

The comparable sales approach is by far the most suitable for oil and gas use because the accepted definition of fair market value is based on the concept of comparable sales. The comparable sales approach may be easy to apply in the case of real estate, where a three-bedroom, two-bath home in a subdivision can have its value estimated by comparison with other homes sold in the same subdivision.

But in the oil patch, it is more difficult to draw comparisons.

Still, this method is widely used. The appraisal is based on identifying key parameters where there is one-on-one comparison, in addition to parameters where there are some differences, but which can still be factored into the appraisal.

Comparable Sales

A true comparable sales approach is the appraisal method based on dollars per barrel of oil. This method is widely used, but is also recognized to have certain flaws. One of the major uncertainties is introduced when gas properties, or properties involving both oil and gas, are appraised. The gas is converted to oil-equivalent. To convert the amount of gas to oil-equivalent, the standard practice is to use either price ratios or ratios based on Btu value.

As of this writing, the price ratio between oil and gas is 10:1; that is, it takes 10 Mcf of gas to produce the same income at the wellhead as does one barrel of oil. In contrast, on a Btu basis, it takes only 6 Mcf of gas to produce the same amount of

heat as does one barrel of oil.

Since both oil and gas prices vary widely, history has shown the ratio between the two will vary even more so, and most of the time in a totally unpredictable pattern. Consequently, when researching transactions involving both oil and gas, it is important to establish whether a price ratio or a heating value ratio has been used in order to arrive at the barrel-of-oil equivalent.

In order to introduce a standard for the industry, this author has for a number of years converted the first half of the gas reserves on a price basis, reflecting the fact that the value of the property is most dependent on the near-term (half-life) price of the oil and gas. This is followed by utilizing the heating value ratio for the second half of the gas reserves, which would come far out in the future when the relationship between oil and gas prices may have changed several times, and where, therefore, ultimately the heating value can be considered to give a more realistic ratio.

Data Sources

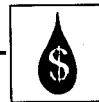
There are a number of data sources available for the amount of dollars paid in recent transactions for each barrel-of-oil equivalent. Table 2 lists some of these sources, which are available to most independent operators.

In order to achieve a higher level of confidence in the unit price, I recommend making two tables of sales data: one relating to oil properties and the other relating to gas properties. This way it will be possible to reduce the uncertainty brought about by the above-mentioned conversion.

TABLE 2

Data Sources For Appraisals

<u>Type of Data</u>	<u>Available From</u>	<u>Phone #</u>
<u>Subscription Database Publications</u>		
M & A Transaction Yearbook	John S. Herold, Inc.	(203) 869-2585
Annual Financial and Reserve Information	Kirkpatrick Energy Associates, Inc.	(303) 893-6633
California Oil Industry Acquisitions	Pacific Resource Management	(818) 795-3214
Quarterly Reserve Reports	Strevig & Associates, Inc.	(713) 952-0186
<u>On-Line or Computerized Databases</u>		
S.E.C. Filings and Legal Resource Index	DIALOG Information Services, Inc.	(800) 334-2564
Production Data	Dwight's Actionline	(800) 468-3381
Industry Journal Text Retrieval	Mead Data Central	(800) 227-4908
Sales and Acquisitions Data	Petroleum Information Corp.	(303) 825-2299
Mergers and Acquisition Database	The Scotia Group, Inc.	(214) 987-1042
<u>Comparable Sales Analyses</u>		
Current Case Histories	Gustavson Associates, Inc.	(303) 443-2209



Another uncertainty introduced by this particular method is lack of sensitivity to the time value of money. If two properties both contain 1 million barrels of recoverable oil, then that one which can produce the 1 million barrels in 10 years would typically be worth more than the other property which might produce these reserves over 30 years. Yet the two fields represent the same number of barrels-of-oil equivalent. This particular method would, consequently, evaluate the two properties as being of identical value.

Therefore, in searching for comparable sales and setting up the tables, it is important to consider as many parameters as possible, and then to seek true comparison. An independent operator would introduce errors in his estimate if he were to compare the unit price from a well-established offshore Gulf of Mexico operation with, for example, an onshore operation in the Mid-Continent.

The lifting costs offshore are generally very low, on the order of \$1-\$2 a barrel. In contrast, lifting costs in the Mid-Continent can range \$4-\$6 a barrel. Clearly, the offshore property, with its low operating costs, would be worth more on a dollar-per-barrel-of-oil-equivalent basis than the onshore operation. It therefore behooves the operator to keep separate tables for various types of fields, to the greatest extent possible.

TABLE 3

**Targeted Rate of Return
For U.S. and Some
Foreign Oil Fields**
(Fields less than 25 MMBO)

Country	Post-Tax Rate of Return
U.S.A.	16
United Kingdom	15
Indonesia	12
Malaysia	11
Gabon	19

Income Method

The income method of appraising properties is based on reserve reports yielding the future cash flow from a property. This cash flow is then discounted in various manners not only for time value of money, but also to take into account the profit motive.

This second stage may be done by discounting the future cash flow at a rate substantially higher than the interest rate on current capital for the industry, usually two times current interest rates. These rates can be established by researching the market and back-calculating. Table 3 shows the experience factor from a num-

ber of recent domestic and foreign transactions.

The profit motive, or discounting for the risk of being in the oil business, can also be established on a more subjective

TABLE 4
**Relative Weight of
Risk Factors**
(on scale of 1 - 8)

RESERVE FACTORS	
Methods of Reserve Determination	8
Years of Production History	6
Geological Trap	2
Reservoir Drive Mechanism	6
Geological Control of Reservoir	2
Diversification of Reserves	4
OPERATIONAL FACTORS	
Operator's Experience	4
Operator's Cost Effectiveness	6
Quality of Mechanical Equipment	6
Complexity of Operations/Equipment	3
Operator's Ability to Meet Future Financial Needs	3
Operator's Ability to Improve Production	4
FINANCIAL FACTORS	
Contract Conditions for Hydrocarbons	8
Exposure to Plugging Liabilities	6
Working Interest Purchased (Control)	5

basis. This is usually done by determining a "risk factor" which ranges from 65 to 75 percent for proved producing properties. Then multiply that into the present worth of the future income, discounted only for time value of money. The discount rate at this writing was about 10 percent. A rule-of-thumb is to take long-term U.S. Government bond interest and add 1.5 percent.

The independent operator will frequently find that he has a substantial amount of information about a property acquired either by visiting the site or through operating records. This then enables the estimating party to make subjective comparisons between what he considers the standard property for the area and the one in question.

A typical checklist is shown in Table 4, as well as the relative weight which this author ascribes to each of the factors. Consequently, as the property is being evaluated, the relative quality of the property can be identified and factored into the final development of the so-called risk factor.

It has been found convenient to divide these factors into three major categories:

- Those that are related to the reservoir itself;
- Those that are related to the operation thereof; and

- Those that are related to the market and environmental risks.

In short, establishing this risk factor is in reality estimating the probability that the cash flow originally developed by the reserve report will really come about. Therefore, a factor of 70 percent, when multiplied into the present worth of the future cash flow stream (taken at 10 percent) will correspond to saying there is a 70 percent probability that the reserve estimate and financial forecast will be met.

Abandonment Liability

Both the comparable sales and income appraisal approaches include consideration of whether there is any capital investment in the property itself. This may be workover capital at the beginning of the life of a property, or it may be salvage liability toward the end of the property life. It is particularly important these days when appraising a property to take this potential liability for abandonment cost into account.

Abandonment liability has changed drastically over the years. The days of equating the salvage value of equipment with the cost of abandonment are long gone, particularly in states where environmental concerns have created many new regulations that impose strong capital demands on the operator during abandonment.

Unfortunately, most computer programs used for reserve estimates provide an erroneous picture of this liability when utilizing reserve reports as bases for estimating fair market value. Consequently, it is safer to take out the capital for abandonment, determine its present worth through a separate computer program, and then deduct that liability separately, once the fair market value is estimated.

After the various appraisal approaches have been applied to a property, the operator must reconcile the different values and come up with the fair market value estimate. The term reconciliation is a concept well known in other appraisal professions, and it must also be applied in cases of oil and gas properties. It is the act of making a subjective judgment among the various values derived from the different approaches.

The fair market value that is sought is definitely not the average of the various values, although it may lie close to that if all of the individual approaches have yielded close values. Rather, the reconciliation looks at the various approaches and comes up with a judgment as to which of them has yielded a number in which the operator has the highest confidence. That number may then be adjusted slightly, depending on the results of the other approaches.



If very widely ranging values have been estimated, this is a sign that an error or an omission may have been made in the basic work, and the operator needs to go back and check his original assumptions.

Undeveloped Properties

Since most appraisal approaches originated with proved producing properties, it is not a surprise that the values from the various methods lie relatively close in the appraisal of producing properties. Likewise, it is not a surprise that use of the appraisal methods for non-producing categories, or reserves which are yet to be developed, may yield widely varying numbers. Specifically, the operator is warned that properties with very high

development cost liability cannot be appraised by the income method.

As a rule of thumb, as long as the development cost is an order of magnitude less than the fair market value of the reserves, then the income method can be carefully applied. If the order of magnitude of the development cost is large compared to the value of the reserves, then the income method becomes inapplicable.

The fair market value to be appraised has now become the difference between two large numbers of the same order of magnitude, and both with uncertainties. Consequently, the resulting value has a very high uncertainty related to it.

The other reason the income method

becomes inapplicable to an undeveloped prospect is the fact that timing cannot be determined. A prospect may be spudded the day after the acquisition date, or it may lie undrilled for many years, or may never be drilled. Consequently, the value of the future cash flow stream cannot be estimated, since it is difficult to estimate whether cash flow should start next year or 10 years down the road. □

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