

# The Value of Oil and Gas Reserves Information

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## Introduction

Over the past few years, the subject of oil and gas “reserves” and the definition(s) thereof have been the focus of a significant effort by SPEE, SPE, AAPG, and other organizations, along with interested individuals, from within and outside the petroleum evaluation profession. One of the explanations for the effort to standardize oil and gas “reserves” definitions and application rules under the Petroleum Resource Management System (“PRMS”) was that - “...*investors need this information...*” and, therefore, the definitions and rules of application should be made uniform and consistent. While the PRMS does not provide an indication of the intended purpose of the new definitions the body language and context of the long-term discussion strongly suggests an intent for use in regulatory reporting of “reserves” under FASB 69 and/or the international equivalent.

More recently the Securities Exchange Commission (“SEC”) has shown an interest in updating the “reserves” definitions that have applied to SEC filings since 1978 and has issued proposed new definitions that could go into effect in 2009. The development of the PRMS and the SEC concern about oil and gas reserves reporting criteria are not coincidental. The SEC has described “reserves” as the oil industry’s biggest asset and has embarked on a wide ranging study of possible revisions to reporting rules. The recent PRMS was predicated on the need to codify “reserves” definitions to allow more consistent reporting; with one of the goals being to encourage the SEC to accept the new definitions. At least one school of thought suggests that the SEC should adopt PRMS in lieu of the current SEC definitions and reporting criteria. The purpose of such a revision of SEC policy would presumably be to assist “investors” in oil and gas companies by providing “improved” information. Whether this is actually the case is a subject for another debate. SEC has asked for and received comments from SPEE among others regarding the concept of changing definitions.

While most of the attention has focused on the definition(s) of reserves and the possible inclusion of risk classes beyond Proved one aspect of the issue, the utility to investors of the reserves and “standard measure” of future income, has not been addressed, at least not publically. Before expending time and effort to revise the SEC reserves reporting rules, perhaps it might be useful for the SEC, reporting companies, and energy company investors to consider this question:

***Does the effort to report oil and gas reserves under the current or revised definitions provide information that is useful to investors? Put another way; Is the oil and gas reserves information reported in SEC Form 10-K and 10-Q of real value to investors and, if so, what is the value of that information?***

It is important to put this question in context by remembering that the SEC was directed by Congress in the 1970's to collect “reserves” information from energy

companies but not because SEC was particularly qualified to do so; the USGS would have been a better choice. Neither had the SEC determined that the “reserves” data was necessary for financial reporting purposes. Apparently, the SEC was given the job because oil and gas companies were already sending information to the SEC for financial purposes and the “reserves” data was thought to be a relatively easy add-on. Like any good government bureaucracy, the SEC shouldered the burden and did not relinquish it even though the DOE and EIA would later become much more effective data collection vehicles for reserves and all manner of other data. Fortunately, the SEC was dissuaded from trying to convert the reserves data into a balance sheet asset so that the information is now only provided as part of the notes to the Form 10-K. The continuing justification for reporting of oil and gas reserves is that the information is necessary and useful to “investors”.

## **Premise**

The premise of this study, derived from the circumstances discussed above, is that information regarding the “reserves” of oil and gas attributed to a company, as reported to investors in SEC filings, has value to those investors in assisting them in making decisions regarding investments in petroleum companies. The “reserves” information is included in SEC filings ostensibly because it allows investors to have data which theoretically influences the value of the company as an investment option.

## **Objective of Study**

***Can the value of reserves information be determined and, if so, what is the value of that information?***

This objective can be approached in several ways.

- (1) How is the value of the company related to the volume and/or value of reserves as measured by SEC reporting requirements?
- (2) Do changes in reserves reported to SEC result in changes in company value?
- (3) To what extent do investors rely upon reserves information in making judgments about a company?
- (4) Is the reserves information provided reliable and useful for making equity value decisions?

Finally, as an ancillary objective, would “investors” be better served by a different reporting format for production, operations, and reserves data?

## **Boundary Conditions**

This study sets two boundary conditions: First, “value” is determined by the market value of the traded common stock. The value relation being considered is that of an investor not a lender. Second, an “investor” is defined as any person or institution that might purchase or own equity in a publicly traded oil and gas company.

## **Sources of Equity Value**

Generally, the value of equity in a company is measured by the market value of the stock in that company. The stock value is, according to financial theory and absent emotional interest, predicated on a combination of anticipated future dividend payments and appreciation in share price. Both dividends and share price appreciation are derived from, among other things, the anticipated earnings from company operations. There are numerous financial indicators of stock value that are related to the balance sheet and income statement and significant or “material” changes in financial condition can certainly influence the value of an individual stock or even the stocks of a whole industry. But the most common indicator of future value is projected earnings per share relative to the price earnings ratio. The SEC has referred to oil and gas “reserves” as the primary asset of energy companies and, while those assets are not reported on the balance sheet with other assets at current value, it is also true that a material change in those assets could be expected to have an influence, by whatever means measured, on stock price.

Given that data for changes in share price and trading volume are readily available in several forms from a number of sources it was decided that a part of the study would attempt to measure the value of reserves information by observing (a) increases and/or decreases in share price and (b) changes in the volume of shares traded resulting from, or appearing to result from, information about company “reserves” becoming available. In order to test the relevance of the reserves-related observations, the influence on share price and trading volumes resulting from the availability of other company information was also examined.

## **Database for Study**

For this study a database of 32 publicly-traded domestic U.S. oil and gas companies was created. The database includes major integrated companies, large independent producers, and regional companies. Many of these companies have been included in prior studies of cost-of-capital and other financial parameters conducted by this firm and others. It was quickly determined that the volume of available information regarding these companies made analysis of all 32 companies in the time available very difficult. Further, the methods of analysis that could be used to obtain useful data needed to be defined and tested before a full scale study could be attempted. Therefore, it was decided to create a smaller set of six companies were that were randomly selected from the larger database for detailed analysis. These companies and their NYSE stock symbols are:

Anadarko Petroleum [APC]  
Berry Petroleum [BRY]  
ConocoPhillips Corporation [COP]  
Newfield Exploration [NFX]  
Plains Exploration & Production [PXP]  
Stone Energy [SGY]

In addition, the period of observation was restricted to January 1, 1998 through April 30, 2008.

Data for the study was collected from a number of sources and included:

- Annual Reports and SEC Form 10-K and 10-Q
- Historical Daily Closing Stock Price and Trading Volume
- Press Releases and Other Publically Available Information
- Investor Presentations made by the Company
- Opinions about the Company issued by Equity Analysts

While Annual Reports are issued only once each year and SEC 10-K/10-Q filings only occur periodically and must conform to SEC rules, **company-issued information**, primarily in the form of press releases, tend to be much more frequent and provide ongoing insight into the circumstances of the company. The information provided from this source includes such things as announcements of quarterly and year-end financial results, time and place of investor conferences, acquisitions and/or divestitures, management changes, stock splits and repurchase programs, changes in and/or payment of dividends, new discoveries and/or developments, and changes to production/operations and reserve data. While many of the announcements were primarily of a public relations nature many other announcements, such as earnings reports and dividend declarations, could reasonably be expected to have some measurable, if not material, effect on stock price.

The historical daily stock prices and trading volumes for each company were tabulated for the observation period. The subject of the company-issued information was then compared to the closing stock price and trading volume as of the date the information was made available. In a similar manner, the dates of issuance of (1) Annual Reports, SEC 10-K/10-Q, and (2) changes in analysts Buy/Sell opinions were recorded in comparison to stock price and trading volume. Analysts opinions in the form of upgrades or downgrades of the stock are treated as significant events because they could be expected to have direct and immediate effect on the market for stock. The results of this data compilation are shown graphically for each company in Exhibits I through VI.

Using the stock price, trading volume, and information announcements about the company, tabulated on a daily basis, it is possible to observe any changes in price and/or trading volume that occurs coincident with reported information of any kind. While a positive cause and effect relation is difficult to define or measure, presumably the degree or amount of price change in response to any piece of information, absent any other influences, would be a reasonable measure of the value of that information. Each of these information sources was compared to the closing stock price and the trading

volume on the date that information became available and the 2-3 business days following. In addition, the change in stock price from day to day was calculated as the ratio of the closing price on Day 1 to the closing price on Day 2.

An examination of the database for each company from January 1, 1998 through April 1, 2008 provided some interesting and useful observations. However, in order to further test the influence of the reporting of reserves information, the company databases were sorted to provide three additional views of the data.

- Largest increase to largest decline in day-to-day change in closing stock price.
- Largest decline to largest increase in day-to-day change in closing stock price.
- Largest to smallest daily stock trading volume.

### **Observations**

The observations from the sorted and unsorted data arrays were divided into two groups:

- (1) Changes in stock price and/or volume related to reserves information.
- (2) Changes in stock price and/or volume related to other information.

Using this data it was found that the largest day-to-day increases in stock price, and thereby company equity value, were most commonly associated with (a) announcements of quarterly and year-end financial results, (b) analyst's Buy recommendations, (c) dividend payments. However, other events could also be associated with increases in stock price. Conversely, large declines in stock prices were often associated with (a) analyst's Sell recommendations, (b) earnings reports, and other information. Large increases or declines were only rarely associated with announcements dealing only with reserves information or with the issuance of Annual Reports and SEC 10-K filings. Such announcements tend to be associated with relatively neutral price performance.

### **Conclusion:**

Reported "reserves" information, in and of itself, appears to have little or no influence on the performance of the equity value of a company. There is no suggestion from the observable market place that information about "reserves" has very much, if anything, to do with equity value. The obvious corollary is that investors attach little if any value to reserves information, at least in so far as the information is reported under SEC rules and format.

While not unexpected, this result is nonetheless puzzling considering the amount of effort expended on providing the information. In order to examine the issue further it was decided to dig a bit deeper into the "investor" community to find an answer.

## Survey of Oil and Gas Analysts

It is very difficult to gauge the utility of SEC “reserves” information to individual investors. Some individuals or groups of investors may be sufficiently sophisticated to make use of the standard measure and Proved reserves data presented in an annual report or 10-K; but aside from monitoring market activity within a time frame around the date of issue, as described above, quantifying the influence of that information on investors actions is not possible. However, it can be assumed that many investors rely upon professional advisors who are knowledgeable about reserves and standard measure data. In order to assess the use of the SEC-reported information, a survey was taken of oil and gas analysts at major firms to attempt to determine:

- (1) The extent to which they rely upon SEC 10K reserve data to form an opinion regarding the investment quality of a company.
- (2) The extent to which data from either the company or from third-party sources is used in reaching their value opinions, and
- (3) The methodology used in estimating the investment potential of the company as related to “reserves”.

A survey form was sent via e-mail to 40 individuals at various firms who are designated as oil and gas specialists. Responses were received from 10 (25%) of the analysts. The questions are shown as Exhibit VII to this study. The responses varied in some details but the general conclusion is that, while the standard measure data reported in SEC Form 10-K may be used as a reference, analysts attempting to determine the investment value of a company rely upon (a) information from company presentations outside of the 10-K restrictions, (b) estimates of future production from the company’s (larger) properties, and (c) internal evaluation by the analyst using variations in product pricing, capital expenditures, and risk assessments. The objective of the analysts’ evaluation is to estimate future **earnings** which are a function of production and price, not reserves. In that context, Buy or Sell recommendations issued by analysts represent expectations that go far beyond the data contained in SEC reserve measures.

## Recent Activity Analysis

Because some data sources, such as company presentations, are not available for more than a few months (or a year at most), a concentrated review of the period from November, 2007 through March, 2008 was also conducted. Company Annual Reports and 10-K filings were collected for year-end 2007. In addition, copies of presentations made by each company at one or more investors forums were obtained from company web sites. The presentation data was collated with the Annual Reports/10-K data to determine the degree of overlap and the extent of additional information provided in the presentations. It is apparent that these presentations provide more information than is contained in the Annual Report/10-K. However, these presentations are still constrained by SEC rules and rarely provide production or pricing guidance.

## **Comparison to Commodity Prices**

All oil and gas producers are in the commodities business. They explore for, develop, produce, and sell crude oil, natural gas and, in some cases, other commodities such as gasoline and propane. The market for commodities particularly oil and gas is a function of (a) supply and demand and (b) commodity prices.

As a final point of comparison, the changing company equity value, as measured by stock price, was reviewed relative to the price of crude oil on a daily basis over the period from January 1, 1998 through April 1, 2008. Crude oil price data was obtained from EIA for wellhead price and NYMEX futures price (nearest contract close). No attempt was made to define a mathematical or statistical relation between stock price and oil price, however, the empirical observation is that stock price and oil price are directionally related.

## **Conclusions of the Study**

- (1) A change in the value of the equity in an oil and gas producing company is directionally related to the change in the price(s) for crude oil, natural gas and other products; and secondarily by anticipated future production of those commodities.
- (2) The reserves and standard measure information reported by companies in annual reports and/or SEC 10-K filing appears to have no relation to the value of the company as perceived by “investors”.
- (3) The reserves and standard measure data provided and the format of presentation of that data in SEC filings is inadequate for a rational evaluation of future earnings and/or equity value of the company and is, to a large degree, misleading.
- (4) Surveys of knowledgeable analysts of oil and gas companies indicate that information that reflects the future performance expected by the company, as incorporated into the company’s capital budgeting decision process, would be more useful and credible to “investors” than the current SEC format and disclosure rules.