THE GEOLOGICAL ROLE IN RESERVE ACQUISITIONS

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ABSTRACT

In the petroleum industry, reserves are quickly recognized as being a depleting asset. A company must replace the produced reserves or ultimately face going out of business. There are three general ways to acquire additional reserves. First, by exploration, second, by production development activities, and third, by acquisitions; the outright purchasing of known producing or non-producing reserves.

History has shown that geologists play a major role in exploration and production efforts. However, to date, acquisition work has been primarily assigned to engineers. The role of the geologist in acquisitions is complicated because of the variety of reservoir traps, ambiguous because of the difficulty of prioritizing value, and restricted because of the numerous possible time restraints placed on the buying companies. These concerns can be adequately overcome when geological techniques presently available are creatively organized and applied.

Many companies have been forced to sell large reserve packages or divest marginal properties for internal financial considerations, especially in the last few years. Properties that do not fit into one company's production profile objectives can fit very profitably in someone else's operations. Accordingly, acquisitions have become one of the major sources for acquiring new in-house reserves. Often reserve replacement through acquisitions can equal or exceed reserve replacement by both exploration or production activities.

The cost of these acquisitions can be a large percentage of a company's total budget and substantially affect the company's success. Therefore, the application of geological studies, mapping, and future potential evaluations is rightly justified in cost and time, in addition to the engineering review, to reduce the overall risk of making an acquisition. The difficulty is in implementing an acquisition organization concept that fully incorporates and supports the geological functions, along with defining what those functions and duties should be to accomplish an improved reserve evaluation and risk analysis.

The first step is to recognize that the engineer has several production tools using production history to give adequate risked results for present production, except in several situations such as water drives, overpressured reservoirs, tight rock, multiple fault blocks, and fractured reservoirs. These are proved reserve situations where a geologist is needed to develop a volumetric model, because the engineering methods do not work satisfactorily or can be misleading.

Secondly, developmental field studies, conducted even in a short time frame, can identify valuable additional reserves. The industry has many examples of old depleted fields that have been brought back to life after new geological concepts were applied.

Thirdly, behind pipe reserves are rarely given value for acquisition consideration during an engineering study. Geological interpretations can supply the needed volumetric analysis that can reduce the reservoir's inherent reserve risk and allow for these reserves to be given value in an evaluation.

Fourthly, many times exploration prospects are listed just as potential "upside" to an acquisition consideration. The use of a geological investigation of the prospect can often show strong merit in the exploration concepts. Then the use of a Decision Tree Analysis can convert risk to "expected value" to be used in the property evaluation determination.

The proved reserves in any acquisition consideration, should contain the bulk of the asset value. Now if the incremental reserve values identified by geological means are layered in with the proved reserve values, the chances of successfully acquiring the properties are higher and the risk can be controlled to fit with the company's financial situation and objectives using established risk analysis methods.

Risk must be accepted as an inherent factor of the petroleum business. All evaluations will not be right all the time. But the management practice of using a geological supported approach to acquisitions will substantially reduce the chance of making major reserve evaluation errors, and consistency of geological evaluations and risk analysis will, through time, establish an overall success trend.

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Additionally, environmental issues are becoming increasingly more important in acquisition decisions as the ensuing liabilities become more clearly understood. While environmental due diligence covers all disciplines, the evaluating geologist can play a vital role. Several critical areas that require investigation are (A) topography, drainage, and surface waters, (B) history of the land usage and soil types, (C) characterization of the vadose zone (unsaturated zone), (D) water table depth and profile, and (E) groundwater, aquifers, and hydrology. Because of the diversity of environmental elements related to a petroleum operation, a prudent recommendation is to have a qualified environmental engineering firm conduct an independent review to confirm the geologist's findings and investigate all other sensitive environmental concerns.