

15 Years of Prospect Risk Assessment in BP

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BP started using a consistent approach to estimating and documenting risks in prospect evaluation in the late 1970's. The probability of making a discovery was initially assessed as the product of four independent parameters, source-reservoir, seal and structure-although the last two parameters were combined into the single factor of trap at an early stage. A separate probability for the hydrocarbon type was also estimated. During the 1980s, several modifications to this basic 3-parameter approach were made by introducing conditional risking. Play risk is separated off in order to assess the factors contributing to regional prospectivity; the residual, local, prospect-specific risk (chance factor) then became the probability of success *conditional* on the play working. Similarly, each of the 3 parameters could be split into the probability of their existence and the probability of their effective *conditional* on their presence. Finally, whenever alternative models (at either play or prospect level) could be considered feasible, the model risk could be separated from the chance of success *conditional* on the interpretation being correct. Conditional risking introduces the dangers of double

risking and can also lead to multimodal reward distributions with their own pitfalls but generally clarifies the thought processes on the critical risk factors in prospect assessment.

Implementation of rigorous quantitative assessment of each of these factors could clearly lead to a very cumbersome risking system. In practice, the actual risking approach used is tailored to the particular circumstances, and binning or risks, particularly at the play level, is commonly employed in order to simplify the quantitative aspects. As the BP organization evolved into a decentralized, federal structure in the 1990s, the approach to rising prospects within the different business units became more diverse but the underlying principles of assessment remained common, and consistency of product (as opposed to process) is achieved through dialogue at several levels from informal networks through formal peer reviews to Forums of senior exploration managers.

The effectiveness of any approach to risking depends on the accuracy of its predictions. Analysis of such prediction accuracy started in the early 1980's and this

review looks at the experience of the 15 years since 1983. The main attribute analyzed in this area is the aggregate chance of success with subsidiary information on phase prediction-data limitations preclude analysis of the accuracy of the individual risk components.

- Throughout the period, risking has tended to be pessimistic with more discoveries made than predicted-if uneconomic discoveries are excluded, however, this bias is significantly reduced, particularly for the earlier years.
- High risk features tend to be under-risked and low risk features tend to be over-risked.
- With phase prediction, an oil bias is apparent in some areas where both phases are known to be present (i.e., if gas is found; if oil is predicted, gas is occasionally found instead).