

Risk Analysis of Exploration Plays: Retrospective and Prospective

Rose, Peter R., Rose & Associates, LLP, Austin, TX

Petroleum explorationists have probably been practicing practical operational play analysis since the first prospector chased similar fields along an extended fault trend. However, it was only in the early 1970's, after (1) Depositional Models allowed us to visualize repeating stratigraphic combinations; (2) early source-rock studies allowed us to visualize HC Source-kitchens and migration routes; (3) Sequence Stratigraphy allowed us to predict genetic stratigraphic units; (4) the Petroleum System concept encouraged us to synthesize and predict different aspects of genetic sedimentary rock bodies; (5) statistical insights allowed us to identify and use statistics to anticipate reserves distributions and PoS for multi-field plays; and (6) computer software facilitated Monte Carlo simulation and statistical analysis of geotechnical parameters, that exploration plays could begin to be analyzed as full-cycle economic ventures.

Most substantial E&P companies now understand that the most important exploration decision is which new play to enter, not which prospect to drill. They utilize sophisticated, company-consistent risk analysis software to evaluate and rank new exploration plays. However, experienced subjective executive judgment also commonly figures in to the entry-decision.

Sequential data-gathering, guided by value-of-information considerations, have greatly improved our ability to economically evaluate and process frontier opportunities, either by correctly condemning overly risky plays, or improving their risk parameters so they surpass critical risk thresholds, thereby qualifying as legitimate exploration programs. Even so, E&P decision makers still have difficulty in correctly recognizing "company-maker" new plays. In addition, real-option considerations are not routinely part of new-play economic evaluations, so new plays are commonly undervalued.