

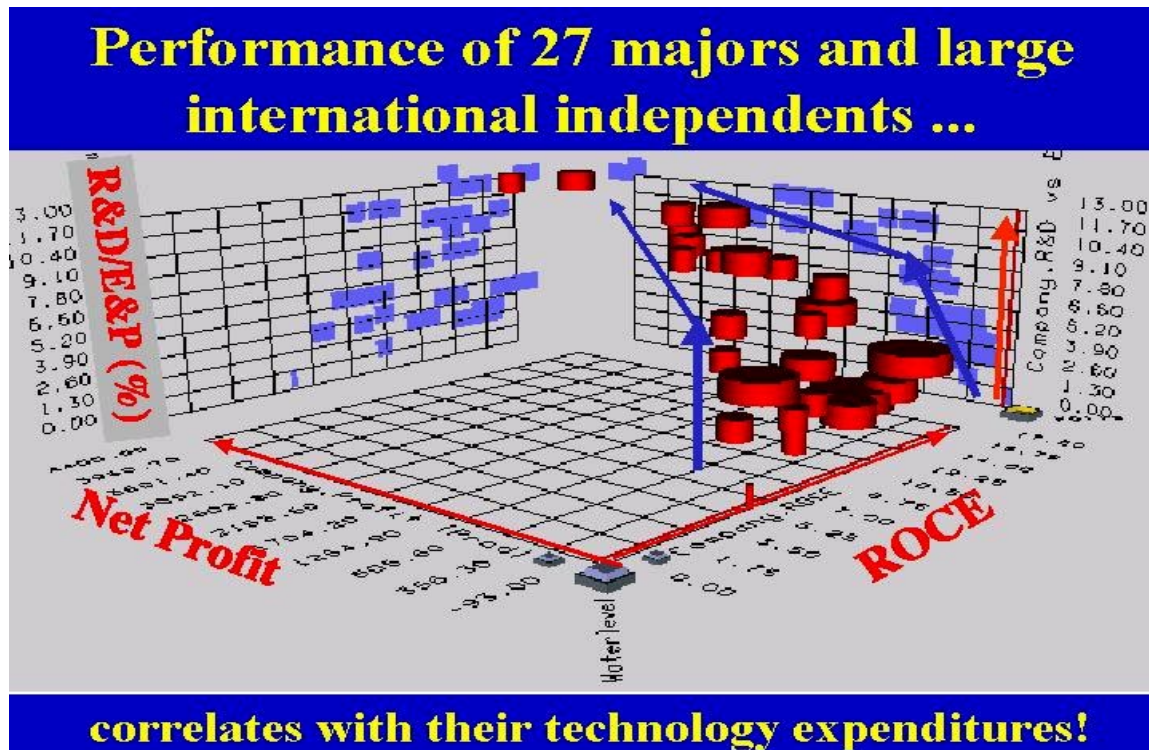


4D Monitoring is Essential

By Rhonda Duey

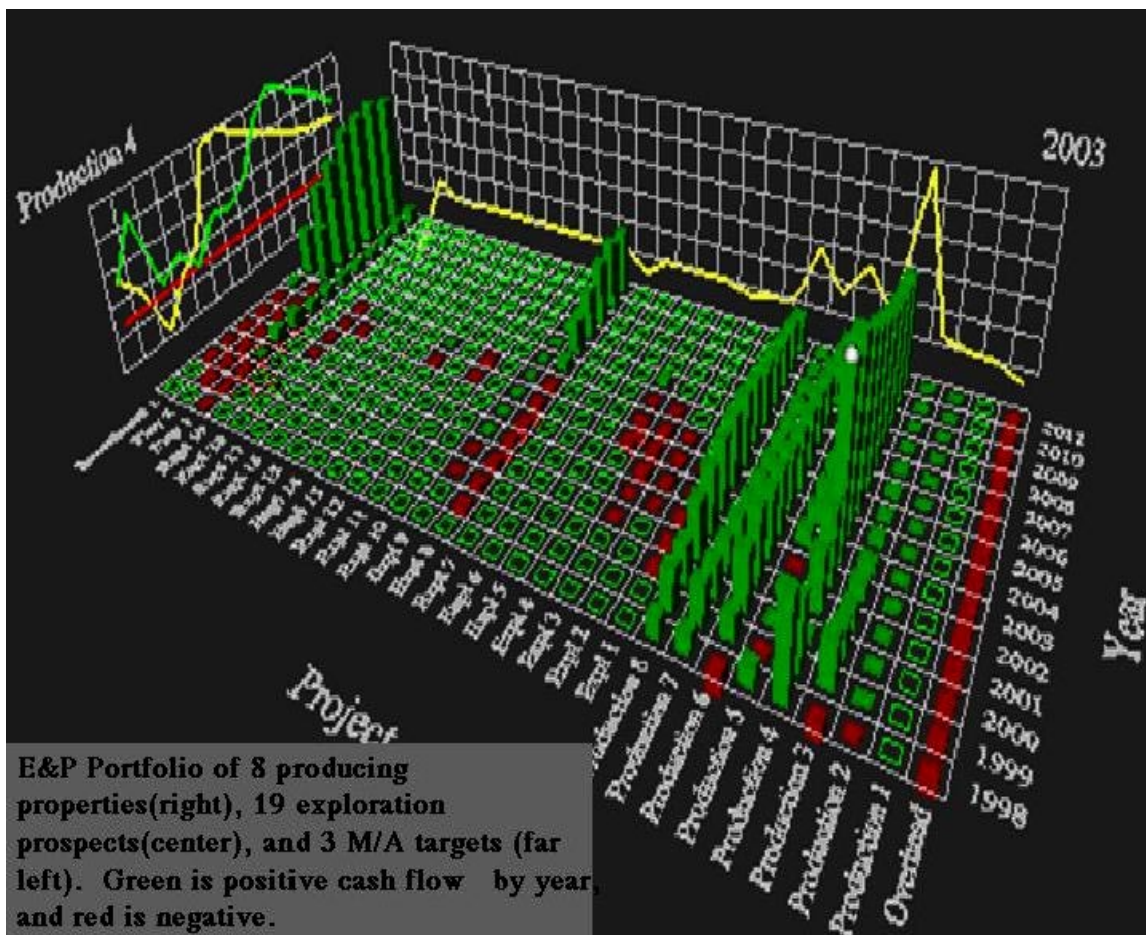
Exploration Technology Editor, Hart's E&P

The oil industry learned some valuable lessons during the last downturn. But those hard times may have fostered a zeal for cost-cutting that could threaten the use of technology which can help extend the life of oil and gas reservoirs. Roger Anderson of the Lamont-Doherty Earth Observatory at Columbia University will present a paper at the Offshore Technology Conference that highlights the benefits of reservoir monitoring. Titled "Economics of 4D Reservoir Management," Anderson will argue that 4D reservoir management returns substantial capital compared to the amount invested and is therefore an essential component to responsible field development. "The oil industry is still staggering from the recent price collapse, with management energy focused on cutting costs and improving return on capital employed (ROCE)," Anderson wrote in his abstract. "The major fiscal problem of the energy business is that it is not competitive as an investment vehicle when compared to other growth industries such as computing, the Internet and biomedicine because our ROCE is so poor."



Though refining and marketing continues to drag the industry down with an ROCE of less than 5%, new exploration hot plays can promise more than a 30% ROCE. It is these plays that offer the most hope to reverse the industry's fortunes.

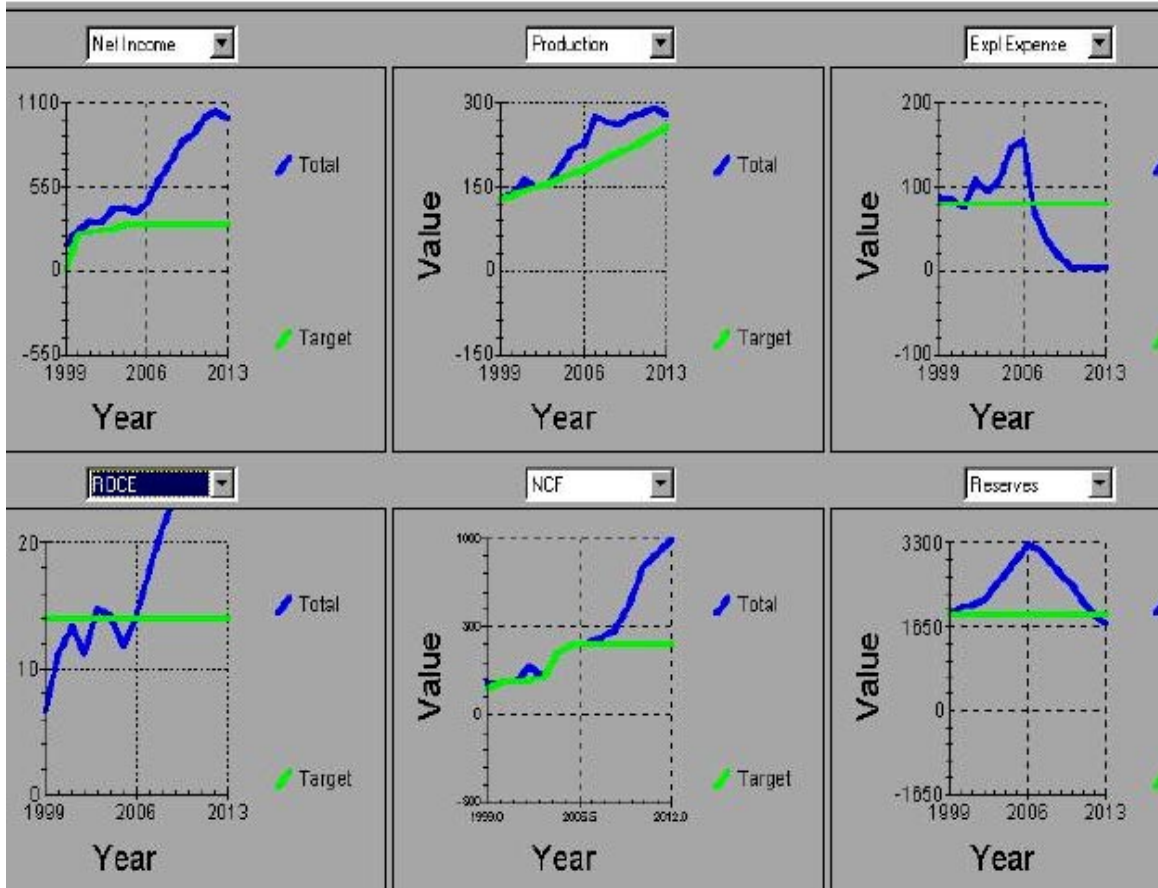
But, Anderson wrote, "It is not enough to discover and prove out large reserve numbers anymore in these giant and super-giant oilfields. As often as not, survival of the oil company owners rests on delivering to market at a 50% or higher recovery rate. When the economics of reservoir management are considered in a stochastic portfolio model of future cash flow, various price scenarios of all major fields of a company can be considered quantitatively. It becomes clear that the high recovery rates are required to balance risk and reward sufficiently. However, if cost-cutting models are used and reservoir monitoring is excluded from future development scenarios for these fields, cash flow shortfalls result in all but the most optimistic future price scenarios."



Anderson proposes reservoir development plans that deliver cash when it is needed and feels that 4D reservoir management is an essential component of this proposal. "The costs of repeated acquisition of 3D seismic surveys and continuous downhole instrumentation and monitoring become cost-effective near-term investments when considered in this long-term cash flow framework," he wrote.

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Anderson will present several case studies from the Gulf of Mexico, North Sea and South Atlantic where 4D reservoir monitoring has already proved itself to be a key to the economic success of the basin. In many of these cases 4D reservoir monitoring has indicated significantly different drainage patterns than what was expected, enabling extraction plans to be changed early in the life of the field.

His conclusion is that recovery will become increasingly important in the 21st century as demand for hydrocarbons continues to rise. And a tool like 4D reservoir monitoring, which gives a clearer picture of which extraction methods will result in the most recovery, should not be eliminated due to short-term cost-cutting measures.