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Risking, Volumes, and Uncertainty in Exploration - A Look Forward, A Look Back

Geoscientists have had to address uncertainty since time immemorial. Within the oil and gas exploration industry, uncertainty is generally measured via estimations of risk and volumes, with results audited on both an individual wildcat and a portfolio basis. In a retrospective look at ExxonMobil's exploration program of the last few years, several general learnings can be developed: - Risking on a technical and economic basis is remarkably accurate on a portfolio basis. This includes consideration of the entire program and of individual risk tranches. - Volumetric estimates have also been quite good on a total program basis. That is, the drilling program has delivered as expected using risked mean as the predictor. - However, individual successful wells display a wider range of volumetric results than would be predicted by their pre-drill range, which was developed using probabilistic methods. Based on experience, this is often due to overconfidence in technology, concepts, and data.

Human factors play a large role in accurate uncertainty analysis - first, in an objective analysis of what the underlying uncertainties are, and second, in a disciplined response to anecdotal and program results. These aspects are illustrated via several examples. Several best practices are recommended for the accurate development and communication of uncertainty: - Initial identification of key uncertainties that will impact the pending business decision - Early characterization of discrete alternative hypotheses before a "most likely" interpretation is embraced - Integration of these scenarios with a complete probabilistic assessment analysis - Clear communication and documentation of the alternatives to facilitate business and commercial considerations