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A Risk Analysis Process for Amplitude Anomaly Prospects

Good exploration portfolio management requires that prospects with seismic amplitude anomalies, like any other prospect, be graded in a systematic and consistent manner. A consortium of 12 oil companies recently developed such a process using approximately 30 amplitude characteristics, including pitfalls. This process was then adjusted and calibrated with the results of 60 prospects, primarily AVO Class 3 anomalies in the Gulf of Mexico.

The consortium concluded that the initial step in amplitude analysis should be an understanding of the exploration setting as well as rock property and seismic data quality. A preliminary probability of geological success, called "initial Pg", is based solely on geologic studies and then modified to a "revised Pg" using a scoring system based on the amplitude characteristics, with an adjustment for the quality of the available data. With the wealth of information achieved, a variance for the prospect reserve distribution can also be derived.

The consortium spent considerable time reviewing amplitude characteristics to clearly state the definition of each characteristic. The scores of each characteristic are used in a weighting process to determine the "revised Pg". The consortium also recognized the importance of being able to refer to a library of consistently graded analog prospects with known outcomes.

Preliminary results of the 60-prospect database suggest this approach can improve the risk analysis of an exploration portfolio, as measured by standard performance tracking techniques. Work is continuing to add AVO Class 2 and 1 anomaly prospects, along with additional Class 3 anomaly prospects, to further calibrate the process.