

# Challenges Associated with Amplitude-Bearing, Multiple-Zone Prospects

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Gulf Coast explorers are now frequently faced with assessing multiple-zone prospects. Some or all of these zones are often incorrectly described as “direct hydrocarbon indicators”. In this paper we deal with best practices of consistency and calibration to ensure appropriate prospect valuation of such cases.

Multiple-zone prospects need to be evaluated probabilistically on a zone-by-zone basis. When a zone is identified as “amplitude-bearing”, a series of questions about the anomaly helps address the appropriate range of uncertainty associated with productive area, net pay and recovery factor. Discussion should focus on the anomaly’s (1) strength and polarity relative to known lithologic sequences and its presumed downdip water leg, (2) conformance relative to downdip structural contours, (3) AVO, and (4) fit to the depositional model.

Results of drilled amplitude targets can be evaluated in the same vein, producing a matrix populated by data that can serve as reality checks on the assigned Geological Chance of Success, Pg. Evaluation schemes should not necessarily equate “amplitude anomaly” with “direct hydrocarbon indicator” because the latter implies more certainty of hydrocarbon presence and a much narrower range of outcomes that is often not warranted.

After each zone’s parameter range is set and assessed for Pg, then a cogent discussion of the geologic phenomena that may produce dependency among zone ensues. Once the nature and amount of dependence has been assessed, the reserve distributions can be combined via Monte Carlo methods. Any commercial truncation is reserved for the entire prospect rather than the individual zones.