ABSTRACT

The recognition and description of geologic dependency is a commonly overlooked or under-appreciated element during prospect interpretation and assessment. It is tempting for teams to spend weeks or months analyzing data to determine net hydrocarbon pore volume under closure, but then only a few hours discussing and evaluating dependencies that may exist among the prospect attributes.

Dependencies are a powerful and essential means of capturing genetic relationships between different reservoirs comprising the prospect. If they remain unrecognized in the interpretation, and are absent from the analysis, the assessment results will likely overestimate the prospect discovery chance and misrepresent the range of uncertainty in estimated success-case volumes.

Two types of dependency should be considered when conducting prospect assessments. The first is volume correlations between parameters; either between different parameters within an individual reservoir, or between the same parameter in different reservoirs. These correlations can exhibit a range of strengths, from weak to maximum. The primary influence of implementing such volume correlations in an assessment will usually be to widen the range of uncertainty in the prospect success-case volumes. The second type of dependency to consider is that between risk elements in different reservoirs. It is therefore only relevant within multi-reservoir prospects. Risk dependency can be complete or partial and can exist between two or more reservoirs that have either equal or differing risk severities for the geologic element in question. Risk dependencies usually have a more powerful impact on assessment results than volume correlations. They can profoundly influence both success-case volume uncertainty ranges and estimated discovery chance.

The number and strength of both dependency types implemented in any given assessment model is a function of the interpretation, the geologic setting, and the confidence that the interpreters have in implying that the genetic relationships exist from their state of knowledge.