Detailed Reservoir Modeling on a Basinwide Scale and Implications on the Decision-Making Process

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More than 3,500 wells producing from the sandstones belonging to the Morrow Group (Pennsylvanian) and underlying Springer Group (Mississippian–Pennsylvanian) were the subject of detailed reservoir analysis within portions of the Anadarko Basin (USA). Within the study area, these reservoirs ultimately will produce more than 8 TCF gas, with individual completions >25 BCF gas. Because the area has been drilled by many companies, a large variation in the drilling and completion techniques has been observed; consequently, large variation in the results exists. Detailed stratigraphic correlation resulted in accurate reservoir nomenclature throughout the study area, which allowed the examination by specific reservoir and within subsets of wells with similar parameters.

The results were unexpected and should have significant impact on the decision-making processes in both exploration and development efforts. For example, mud balance influences how much invasion into a zone occurs. When it is combined with pH of the water, the mud pH demonstrates more impact on ultimate recovery than any single drilling of completion factor examined. Interestingly, mud-water loss (typically below 8 ml) did not seem to have much impact upon this observation. Another observation suggests that the practice of perforating selected intervals of a reservoir has a direct relationship to ultimate recovery—usually not favorable. Extensive stratigraphic correlations, detailed geologic analysis, and the findings presented demonstrate that changes in the decision-making process should result in opportunities for significant infield development, trend extensions, and the further exploration in what may be considered a "drilled out" play.

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