Accurately Characterizing Middle Cotton Valley Reservoirs in the Carthage Field, Panola County, Texas

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ABSTRACT

Middle Cotton Valley sands are commonly bypassed due to a "wet" petrophysical profile. However, some recent completions produced a normal volume of water with a significant amount of gas. The question of the viability of the middle Cotton Valley as a reservoir is the subject of this study.

In a recent 300 well study in Carthage Field, we investigated the middle Cotton Valley zone CV3 for water. CV2 is the uppermost reservoir zone found underlying the Knowles limestone. The CV3 sand is directly beneath the CV2. We found the CV3 bypassed in most wells.

The first step was to address the most common Cotton Valley problem, petrophysical uncertainty caused by complex diagenetic mineralogy. An integrated approach was used. This process integrated log analysis, production data analysis, fracture analysis, geologic mapping, and reservoir simulation to produce reservoir parameters that tied to the gas volume produced. Water production was related to fracture heights and attributed to specific sands. Maps were made showing hydrocarbon pore volume and water produced by zone. Log curves were posted for the interval to compare water production and rock quality.

A recent well by Devon was completed in all Cotton Valley zones. Results showed that the CV3 sand does not produce inordinate volumes of water. Water production maps actually showed less water produced from the CV3 zone than was produced from deeper intervals, in some locations. Hydrocarbon pore volumes in the CV3 sand are similar to those in the most commonly produced deeper reservoirs.

We conclude that the CV3 sand in the study area can be a good reservoir, as demonstrated by recent completions.