Reservoir Characterization of the Pennsylvanian Cleveland Sandstone C Unit, Cleveland Field Unit, Northeastern Oklahoma

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Abstract

The Cleveland Field in northeastern Oklahoma has produced an estimated 50 MMBO since its discovery in 1904. A re-evaluation of this mature oil field was undertaken to identify bypassed "pay" and to estimate the ultimate hydrocarbon recovery using high resolution reservoir data. The study was focused on the Middle Pennsylvanian (Desmoinesian) Cleveland Sandstone in what is now the "Cleveland Field Unit." The Cleveland Sandstone, which is approximately 120-200 ft. thick, is composed of four distinct depositional units, or zones (A, B, C, and D, in descending order). Considerable oil has been produced from the B zone of the Cleveland, as evidenced from recent core and log data. Yet other oil-bearing zones in the Cleveland, only subtly finer grained and more inter-bedded than the B zone, have been discounted be-cause older tests and calculations from vintage logs resulted in past assessments that these sandstone bodies are effectively non-productive. However, mod-ern tools for evaluation, along with innovative drilling and completion techniques, have rendered these same sandstones to be profitable, productive units. Zone C, which best exemplifies this re-evaluation, is highlighted here. The techniques used in this study are thought to have application in other mature fields, especially in the Mid-Continent.