

Reservoir Architecture - Does it make a difference when Waterflooding? Parks (Caddo) Field, Stephens County, TX

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Parks (Caddo) Field is located on the Bend Arch in Stephens County, Texas. It was discovered in 1916 by Texas Oil Company. The field produces from the Strawn Sands (Buck Creek Sands, Brandon Bridges Sands, & Lauderdale Sands), Caddo Lime, Lake Sands, Marble Falls, and Duffer. Most of the 2.8 mmboe produced from the field has been produced from the Caddo (Strawn age) reservoir at 3200 feet.

The hydrocarbon accumulation is a part of a large combined-structural-stratigraphic trap that greatly exceeds the size of the Parks lease. The gross Caddo reservoir interval is 100-150' thick with an average 8% porosity and water saturation of 27%. The Caddo interval is a mosaic of medium- to coarse-grained, muddy, fossiliferous limestone distributed as small-scale (<20' high) phylloid, algal buildups (or mounds) interconnected with finer-grained, subtidal limestones (intermound) in a protected lagoon environment. Pore types include secondary fossil molds, vug and channel pores, with lesser amounts of intercrystalline dolomite and primary, interparticle limestone. Although the more permeable grain-rich porosity development is discontinuous, it is pressure-connected throughout the entire lease by means of a more widely distributed intermound facies.

In 2004, Whiting Oil and Gas Corporation purchased the Parks Field from CrownQuest Operating, LLC. Waterflooding the Caddo was seen as the upside for this 5667 acre property. There are six Caddo floods in the area with secondary-primary production ratios averaging 2.4. Texaco initiated six, five-spot patterns on the south side of the lease in 1973. After putting over 58 millions barrels of water and only getting back +200,000 barrels of oil, the waterflood was halted. It was concluded that there was a secondary gas cap on the southern dome that accounted for the poor waterflood performance.

In 2005 and 2006, Whiting drilled 16 wells initiating five, five-spot patterns in the low between the southern and northern domes. Water started going in the ground in October 2005. During the program 409' of core was taken, modern logs suites were run, wells were mudlogged and a 3d-seismic survey was interpreted. After reviewing 507' of core from four wells a picture of the reservoir emerged that defines the reservoir facies and establishes the rock-to-log correlations. This work helps to explain the reservoir potential, initial program results, and defines areas of future development.