

Poster 7      Influence of Accommodation Space on Distribution of the Upper and Lower Skinner Sandstone Reservoirs in Oklahoma

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The Skinner sandstones, Pennsylvanian (Desmoinesian) Cabaniss Group, produce large volumes of oil and gas in central and western Oklahoma. To develop a better understanding of the processes controlling sand deposition, the Skinner interval was reinterpreted within a sequence stratigraphic framework instead of the traditional lithostratigraphic one. The new stratigraphic framework is based on the premise that dark "hot" (radioactive) shales represent maximum flooding surfaces (MFS) and that the basal contacts of deeply incised channels represent sequence boundaries.

Based on these caveats, the Skinner interval contains two primary sequences, the lower and upper, respectively. Within the sequence stratigraphic framework, the traditional Lower Skinner interval appears to be part of the Upper Pink sequence. The Lower Skinner sequence boundary is represented by the erosional contact between fluvial-dominated incised valley fills and the underlying Pink limestone or "Skinner" shale. The upper boundary for the Lower Skinner sequence is the base of the Upper Skinner sandstone. Valleys that form the sequence boundaries formed during drops in sea level. Sand accumulation in these valleys occurred during the lowstand systems tract (LST) and the transgressive system tract (TST).

Coal-forming peats with widespread distribution apparently were deposited during the TST. With continued transgression and deepening water, diagenetic conditions dominated and dark-colored mud accumulated that ultimately became the "hot" shale markers, which are identified as the MFS. Faunal and mineralogical evidence in these shales supports their interpretation as deeper-water deposits. During the highstand systems tract (HST) delta progradation dominated deposition. Large volumes of sediments were carried into the Anadarko and Arkoma basins. Subsidence, which was approximately equal in both basins early in Skinner time, slowed in the Arkoma Basin prior to Upper Skinner deposition. In contrast, rapid subsidence created new accommodation space in the Anadarko Basin. As a result, Upper Skinner fluvial systems flowed westerly around the southern end of the Nemaha positive area and into the Anadarko basin.

Channel-fill complexes in both the Upper and Lower Skinner sequences contain reservoirs that produce large volumes of oil and gas. On the Northeastern Oklahoma Platform, incised valley fill reservoirs in the Lower Skinner sequence can produce in excess of 400 thousand barrels of oil (MBO) per well. In the Morewood trend of western Oklahoma, individual wells in the Upper Skinner channel trend have produced in excess of 6 BCF and 100 MBO.