

Frio," Vicksburg, Wilcox, Olmos, and San Miguel, and represent a vast amount of past and present production and future potential. Various petrophysical parameters such as matrix density and velocity, formation-water resistivity, porosity, and water-saturation ranges influence production. Identification of productive zones is assisted by use of the Dual Induction Laterolog, the Borehole Compensated Sonic Log, the Formation Density Log Compensated, and the Compensated Neutron Log, as well as hand- and computer-processed interpretations.

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Depositional Environment of Woodbine Sandstones, Polk, Tyler, and San Jacinto Counties, Texas

Woodbine sandstones produce mostly natural gas in stratigraphic traps at Seven Oaks, Hortense, Leggett, and R. B. fields in Polk County, Texas. The Woodbine section can be divided into lower, middle, and nonbioturbated and bioturbated upper units of interbedded sandstones and shales. Strike-trending, pod-shaped concentrations of bioturbated upper sandstones are the principal reservoirs in these fields.

The lower and middle Woodbine sandstones are thinly to thickly bedded and isolated in black, nonbioturbated shales. Thinner sandstones average 0.25 ft (7.5 cm) in thickness and typically consist of more complete turbidite sequences (ABCDE, ABCE, BCE, and CDE). Thicker sandstones that range from 0.5 ft (15 cm) to as much as 7.35 ft (22 m) contain less complete sequences (A, AB, and BC). Thicker sandstones with less complete bedsets represent channel deposits whereas the thinner sandstones with more complete bedsets represent overbank deposits. Thinly bedded, nonbioturbated upper Woodbine sandstones are gradational upward into the thickly bedded, bioturbated sandstones. The nonbioturbated sandstones contain only turbidite bedsets reflecting overbank deposition. Ordered sequences are absent in the bioturbated upper sandstones. A few relict, ripple-laminated intervals suggest that the bioturbated sands were deposited by more persistent, low-flow-regime, possibly geostrophic currents, rather than by turbidity currents.

Woodbine clastic deposition is associated with a prograding shelf margin. Electric-log correlation and seismic sections suggest that the lower sandstones were deposited as a group of channel and overbank turbidites on the lower slope. Middle sandstones were deposited in isolated feeder channels located farther up the slope and closer to the shelf break. The thick section of slope shale containing the lower and middle turbidite sandstones is overlain by thinly to thickly bedded upper sandstones interpreted to be shelf-margin sandstones that cap the prograding slope sequence. A turbidite origin for most Woodbine sandstones in the Seven Oaks producing area suggests that channel sandstones associated with submarine fans located farther downdip, possibly over the Sligo reef break, may form extensive dip-trending reservoir bodies.

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Middle Strawn (Desmoinesian) Cratonic Delta Systems, Concho Platform of North-Central Texas

Terrigenous clastic- and carbonate-rock units forming the middle third of the Strawn Group were deposited in the Fort Worth basin and on the adjacent Concho platform of north-central Texas. Four significant transgressive-regressive cycles comprising the interval between the top of the Brannon Bridge Limestone and the top of the Brazos River Formation have been evaluated employing data gathered from 4,000 well logs and 35 measured sections. Subsurface maps indicate that four discrete, vertically persistent, deltaic depocenters, two carbonate banks, and an embayment strand-plain complex are present within the area. The average thickness for the total vertical stratigraphic interval is 1,000 ft (300 m), or approximately 250 ft (75 m) per cycle of deltaic progradation and abandonment.

When active tectonic downwarping diminished in the central part of the Fort Worth basin, middle Strawn cratonic deltas prograded across the filled foreland basin and out onto the stable, gradually subsiding Concho platform. Deltaic facies present on the platform for all four cycles involve thin, usually less than 140 ft (42 m) thick, multilateral, high-constructive elongate and lobate systems. For the lower two cycles, the Buck Creek and Dobbs Valley sandstones of outcrop, deltaic progradation extended to the western margin of the platform more than 200 mi (320 km) downdip from the source area. Carbonate-bank deposition subsequently was established on the distal ends of these oldest delta sands and westward deltaic progradation was less extensive with the upper two cycles. A strand-plain—embayment system composed of mudflats, chenier sandstone bodies, and thin bay-head deltas developed between the two principal deltaic depocenters on the platform. The Midland basin on the west was a poorly defined, gradually deepening, depression; no true Desmoinesian shelf-edge or slope systems have been discovered.

High-constructive delta systems attributed to the Dobbs Valley (cycle II) and Brazos River (cycle IV) units have sandstone accumulations in excess of 200 ft (60 m) at one depocenter along the northwestern margin of the platform and at a second one on the northwestern rim of the Fort Worth basin. These thicker deltaic complexes contain linear, multistoried sandstone bodies whose geometries resemble bar-finger sands of the modern Mississippi delta. Valley-fill fluvial deposits incise the high-conservative deltaic facies. The Arbuckle and Wichita Mountains were the major sources for the more arkosic, northern delta systems. The Ouachita foldbelt furnished the chert-rich detritus for the fluvial-deltaic facies on the Concho platform.

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Upper Cretaceous–Lower Eocene Strata, Hainesville, Keechi, and Oakwood Salt Domes, East Texas

Salt domes in east Texas are possible sites for nuclear waste repositories. Tectonic stability is a critical factor in evaluating suitability as a repository. Subsurface studies were undertaken to determine stratigraphy and