are both point-bar and stream-mouth-bar sandstones and conglomerates. The point-bar deposits are the most important reservoirs and many well-documented examples show their sizes, shapes, trends, and reservoir characteristics.

Detailed data from dry holes in the Morrow Formation show relations which give reliable clues to the existence of nearby reservoir deposits. Study of the stratigraphic and facies framework of the Morrow gives insight into processes of deltaic sedimentation which should be useful in local and regional exploration as well as in production operation.

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Channel Sandstone Oil Reservoirs of Pennsylvanian Age, Northwestern Ness County, Kansas

Channel sandstones of Pennsylvanian (Desmoinesian, Cherokee) age are unusual oil reservoirs in T17S, R24W, Ness County, Kansas. A thickness map of the interval from an overlying marine marker, the Fort Scott Limestone, to the underlying Mississippian carbonate rocks depicts the topography of a former land surface now buried 4,400 ft (1,340 m) deep. Where the mapped interval exceeds 125 ft (38 m) sandstone deposits fill incised paleovalleys.

The sandstones are interpreted as channel-fill sandstones because of: (1) their position filling sinuous valleys; (2) their cross-section shape, convex base, and flat upper surface; (3) their dimensions—to 60 ft (18 m) thick, one-fourth mi (0.4 km) wide, and over 6 mi (9.6 km) long; (4) the coarsening downward from very fine quartz grains to coarse sand and pea gravel at the base; (5) the enhanced permeability (over one darcy) near points of change of valley direction (point-bar deposits?); (6) the common presence of 10 to 20° dips and cross-bedding in cores; (7) the lateral gradational mixing of quartz sand with residual cherts. Greenish clay is present in the upper fine-grained sandstones and glauconite in the lower coarse sandstones.

Six wells encountered isolated sandstone lenses (pressure decline on drill-stem tests) and produced only 7,131 bbl of oil per well before abandonment. The other 28 wells produce oil from channel sandstone reservoirs with water drive. Over 100,000 bbl of oil per well (40 acre or 16 ha. spacing) will be recovered from them. It is estimated that the 17 best wells (50% of the wells) will have gross ultimate production of 164,000 bbl of oil per well.

Prospecting for channel-sandstone oil reservoirs is hazardous with 43 dry holes surrounding the 34 channel-sandstone oil wells.

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Palynologic and Plant Compression Evidence for Desmoinesian-Missourian (Pennsylvanian) Series Boundary in Northeastern Oklahoma

Palynologic and plant-compression-bearing coal and shale deposits in Tulsa County (northeast Oklahoma) contain floristic evidence for separating the Desmoinesian and Missourian Series at the base of the Checkerboard sandstone (upper Seminole Sandstone). Three coal seams, Dawson (below), Seminole, and Checkerboard, were formerly placed in the Missourian Series. The two lower seams and their associated shales and sandstones are here removed to the Desmoinesian Series. Dawson coals contain approximately 42% *Thymospora pseudothiessenii* spores and 17% those of *Lycospora* sp., whereas the Seminole coals contain none of the former and only 1% of the latter. Sphenopsid spores increase from 4% in the Dawson to 25% in the Seminole. Filicineae and Pteridospermae palynomorphs are 65% in the Dawson and 37% in the Seminole. More abundant in the Seminole are the genera *Endosporites, Calamospora, Triquitrites,* and *Laevigatosporites.* Checkerboard coals and shales contain the Missourian genera *Centonites, Trivolites, Plicatisporites,* and *Tuberculatosporites.* Compression floras associated with the Dawson and Seminole coals contain only 9 known species of which *Calamites suckowii, Annularia stellata, Pecopteris pseudovestita(?), Alethopteris serlii,* and *Neuropteris scheuchzerii* are common. The Checkerboard shales contain possibly 29 species. The brachiopod, *Mesolobus mesolobus,* a Desmoinesian Series invertebrate, is present in shale above the Dawson coal, giving further support to the removal of that unit from the Missourian to the Desmoinesian Series.

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Early Pennsylvanian Braided Stream Sedimentation, Northwest Arkansas

The Bloyd Formation (Morrowan) of northwest Arkansas is a heterogeneous succession of sandstone, limestone, shale, and siltstone units that accumulated in shallow-marine and nonmarine environments during Early Pennsylvanian time. Sedimentation occurred on a gentle paleoslope inclined to the south. The basal Brentwood Limestone Member is overlain in extreme western Arkansas by coal-bearing shale and siltstone strata of the nonmarine Woolsey Member. Eastward, Woolsey strata pass into a thick and laterally extensive sandstone body characterized by abundant sets of tabular cross-strata, medium to coarse-grain size, and beds of quartz-pebble conglomerate. The unit is bounded below by a marked unconformity that displays up to 6 ft (1.8 m) of erosional relief on the underlying Brentwood Member.

Erosion surfaces occur throughout the unit and bound genetically significant intervals characterized by a consistent succession of sedimentary structures. Quartz-pebble conglomerates resting directly on erosion surfaces are overlain by sets of large-scale tabular cross-strata. Thin intervals of ripple-laminated sandstone containing well-developed ripple bed forms with occasional clay drapes overlie the tabular sets and are bounded above by erosion surfaces. These genetic intervals are repetitive throughout the unit and reflect sedimentation by initially competent but rapidly waning current systems. Paleocurrent measurements derived from tabular cross-strata indicate that the sediment was emplaced by south-flowing unidirectional currents characterized by low dispersion.

The succession of sedimentary structures contained within genetic sequences and paleocurrent data indicates that the middle Bloyd sandstone body accumulated in several south-flowing braided stream systems in northwest Arkansas.