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Pennsylvanian Fan-Delta Sandstones, Palo Duro Basin, Texas

Pennsylvanian sedimentation in the Palo Duro basin was strongly influenced by tectonic events. Highlands surrounding the basin were uplifted early in the Pennsylvanian Period and were major sources of clastic sediment. Arkosic sandstones ("granite wash") contain abundant feldspar and granite rock fragments derived from exposed Precambrian basement rocks.

Granite wash deposits are thickest in the northeastern and northwestern parts of the basin, and lobes of sandstone extend to the southern basin margin. Individual beds, which are 10 to 40 ft (3 to 15 m) thick and are laterally discontinuous, cannot be correlated more than a few tens of miles. Granite wash deposits vary from medium sandstone to conglomerate, and upward-fining sequences are common. These sandstones contain scours and large-scale trough or foreset cross-beds. Limestone commonly is interbedded with granite wash sandstone and shale.

Thick wedges of Pennsylvanian granite wash adjacent to mountain fronts are characteristic fan-delta deposits. Coarse clastic material was carried off the uplifts to adjacent fans by high-gradient braided streams. Near the source areas, sediments are entirely terrigenous clastics, which were probably deposited in subaerial delta-plain environments. Coal and thin limestone beds are interbedded with delta-plain sandstones. Carbonates become more abundant downdip where they were deposited periodically in subaqueous, distal-fan delta environments. Periodic movement along faults may have been responsible for the initiation of major clastic cycles.

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Correlation of Cherokee (Desmoinesian) Sandstones, Missouri-Kansas-Oklahoma Tri-State Area

Traditional stratigraphic classification of the sandstone-bearing Cherokee Group (Desmoinesian) in southeastern Kansas and contiguous areas has not recognized the uncertainty of correlation from type areas of the Bluejacket and Warner sandstones in northeastern Oklahoma, across poor exposures in Kansas, to outcrops of similar-appearing sandstones in Missouri. New data, logs, and cores of recently drilled shallow test holes, suggest that the "Bluejacket" of Missouri is older than the Bluejacket Sandstone Member of the Boggy Formation of Oklahoma and that the "Warner" of Missouri is younger than the Warner Sandstone Member of the McAlester Formation of Oklahoma. All four sandstones are present in some subsurface locations in Kansas. The discontinuity of these sandstones is accounted for through their origin as alluvial-deltaic sands.

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Major Structural and Stratigraphic Features of Anadarko Basin

The Anadarko basin of western Oklahoma and the Texas Panhandle continues to be one of the most active and prolific petroliferous provinces of the continental United States. More than 150 companies and an equal number of independent geologists are actively engaged in the exploration for additional oil and gas reserves in this Mid-Continent basin.

The sedimentary sequence in the Anadarko basin is represented by a wide variety of lithologic units ranging in age from Cambrian-Ordovician through Permian. Important reservoir rocks are present and proven in each of these major systems. Regional facies changes from dense limestones to porous dolomites, from porous sandstones to tight limestones, and regional pinchouts of sandstones in sand-shale sequences all provide the necessary trapping mechanisms for the accumulation of hydrocarbons. In addition, three major unconformities truncate downdip reservoir rocks to create long regional trends of oil and gas production. The possibility of discoveries of additional trends of this nature is considered excellent as demonstrated by current industry activity.

The southern boundary of the Anadarko basin is formed by the Amarillo-Wichita Mountain front fault system. This fault system is characterized by substantial vertical block uplift and regional left-lateral strike-slip movement. The combination of these two Pennsylvanian age tectonic movements creates a complex zone of tensional block faulting, compressional overthrusting, step faulting, and vertical dipping formations.

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Desmoinesian Depositional Systems in Knox-Baylor Trough

The western part of north-central Texas experienced unique depositional processes during the late Desmoinesian.

The early Desmoinesian–Fort Worth basin depocenter was moved toward the west after the Ouachita overthrust. Sediments were carried westward to the resultant Midland basin through the Knox-Baylor trough.

This asymmetric trough (steep on the north) possesses two distinct depositional systems. The south or Concho platform flank has a wave-dominated environment with strike-oriented strand-plain and deltaic sands similar to the upper Wilcox sands of the Gulf Coast. This system is present in Baylor, Knox, Throckmorton, and Haskell Counties. Some of the producing areas are in the Sojourner, Herren, and Weinert fields.

The deep-water environment holds low-flow-regime deposits. They are ripple bedded, lack bioturbation, and are strike oriented. A study of the composition demonstrates well-sorted, clean, fine-grained bodies which indicate significant reworking during long-distance transport. This system extends from northern Knox County southwest through Stonewall County and produces in such fields as the Anne Tandy, Katz, Juliana, and Jud, the most desirable oil fields in the area.

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Depositional History of High-Constructive Delta Sys-