RESERVOIR QUALITY DISTRIBUTION IN THE PENNSYLVANIAN BEND CONGLOMERATE FAN-DELTA SYSTEM OFF THE SOUTHEASTERN CENTRAL BASIN PLATFORM

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ABSTRACT

Chert conglomerates, and associated sediments, of the Bend Conglomerate in Taylor Draw Field, Upton Co., Texas, were deposited in a series of fan deltas that prograded into an open-marine system. The distribution of reservoir quality in these deposits is facies controlled. Permeabilities range from near zero to 30,000 md.

Low permeability conglomerates contain either a mud matrix or abundant calcite fossil fragments. The calcite grains serve as nucleation sites for calcite cementation and, through dissolution, as a source of calcite cement. High-permeability, sandy (chert and quartz) conglomerates have no mud matrix or calcite grains. Some of these conglomerates are cemented with a thin rim of chalcedony, while others have no cement and show strong pressure solution at grain contacts. They are commonly friable and are recovered as loose gravels in the core barrel.

The mineralogy of matrix grains is related to the distribution of the depositional facies within the fan delta. The low-permeability conglomerates were deposited in the subaerial to subaqueous distal fan-delta complex where calcareous marine organisms or mud were mixed with the conglomerate. The high-permeability conglomerates were deposited as thick, channel gravels in the subaerial proximal and mid-fan sections of the fan deltas.

Depositional facies within the fan-delta complex controlled the distribution of calcite grains in the matrix and hence reservoir quality. The fossiliferous conglomerates became tightly cemented with calcite during burial, whereas the nonfossiliferous conglomerates remained permeable. Facies maps of the fan-delta complex therefore can be used to delineate high-permeability conglomerate reservoirs.

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