Sedimentology and Permeability Architecture of Atokan Valley-Fill Natural Gas Reservoirs, Boonsville Field, North-Central Texas

Mark J. Burn,[1] **David L. Carr,**[2*] **and John Stuede**[3]
[1]Bureau of Economic Geology, The University of Texas at Austin, Austin, TX 78713
(Current address: 11A Mayfair Place, New Plymouth 4601, New Zealand)
[2]Bureau of Economic Geology, The University of Texas at Austin, Austin, TX 78713
[3]Scientific Measurement Systems, Inc., 2209 Donley Dr., Austin, TX 78758

The Boonsville "Bend Conglomerate" gas field in Jack and Wise Counties comprises numerous thin (10–20 ft) conglomeratic sandstone reservoirs within an approximately 1,000-ft-thick section of Atokan strata. Reservoir sandstone bodies commonly overlie sequence-boundary unconformities and exhibit overall upward-fining grain-size trends. Many represent incised valley-fill deposits that accumulated during postunconformity base-level rise. This stratal architecture is repeated at several levels throughout the Bend Conglomerate, suggesting that sediment accumulation occurred in a moderate- to low-accommodation setting and that base level fluctuated frequently.

The reservoir units were deposited by low-sinuosity fluvial processes, causing a hierarchy of bed forms and grain-avalanche bar-front processes to produce complex grain-size variations. Permeability distribution is primarily controlled by depositional factors but may also be affected by secondary porosity created by the selective dissolution of chert clasts. High-permeability zones (~2.8 darcys) are characterized by macroscopic vugs composed of clast-shaped moldic voids (~5 mm in diameter). Tight (low-permeability) zones are heavily cemented by silica, calcite, dolomite, and ankerite and siderite cements.

Minipermeameter, x-radiograph, and petrographic studies and facies analysis conducted on cores from two Bend Conglomerate reservoirs (Threshold Development Company, I. G. Yates 33, and OXY U.S.A. Sealy "C" 2) illustrate the hierarchy of sedimentological and diagenetic controls on permeability architecture.

Differences in the Stratigraphic Framework of the Frio and Anahuac Formations in the Louisiana and Texas Gulf Coast Basin

Bruce A. Desselle
Bureau of Economic Geology, The University of Texas at Austin, Austin, TX 78713

The hydrocarbon endowment of the Frio and Anahuac Formations of Louisiana and Texas has made them the most thoroughly studied geologic strata in the Gulf Coast Basin. A review of previous studies of the stratigraphic framework of the Frio and Anahuac Formations in the Louisiana and Texas Gulf Coast Basin reveals that researchers have placed the boundary between the Frio and Anahuac in this basin at different biostratigraphic and lithostratigraphic levels. This review also reveals that in some previous studies the subdivision of the Frio in Texas into lower, middle, and upper zones does not conform to the traditional biostratigraphic zonation scheme.

The index fossils used to mark the boundary between the Frio and Anahuac differ in the Texas Gulf Coast from those employed in the Louisiana Gulf Coast. In the subsurface Frio of Louisiana, the paleontologic top of the Frio is historically placed at the highest occurrence of *Camerina* sp. A. In the subsurface Frio of Texas, the paleontologic top of the Frio is historically marked by the highest occurrence of *Cibicides hazzardi*. Although microfossils characteristic of the *Camerina* A zone are reported from wells penetrating the subsurface Anahuac and Frio, their occurrence has proven too erratic to be employed in a regionally correlatable biostratigraphic framework. This review also shows that some workers place the lithostratigraphic top of the Frio in the Texas Gulf Coast Basin just above the first sandstones lying below the Anahuac shale wedge. These sandstones are actually lower Anahuac *Marginulina* sandstones in the lower and middle Texas Gulf Coast and upper Frio *Cibicides hazzardi* sandstones in the upper Texas Gulf Coast, depending on the dip position of the particular well.

*Denotes speaker other than senior author.