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The Barnett Shale Play, Fort Worth Basin

In terms of monthly production, the Newark East (Barnett Shale) field recently became the largest gas field in Texas. Production has grown from 80 MMCF/D in January 2000 to over 700 MMCF/D at present because of accelerated new-well drilling and old-well reworks/refracs. There are over 2.5 TCF of booked proven gas reserves in the field at present. Newark East field is located in the northern portion of the Fort Worth Basin, just north of the city of Fort Worth. The Mississippian Barnett rests on an extensive angular unconformity. The Barnett must be stimulated to achieve economic flow rates. Currently, wells are hydraulically fractured, but good frac barriers must be present directly above and below the Barnett for this stimulation technique to be successful. Hence, the stratigraphy above and below the Barnett is important to economic production from vertical wells. Recent horizontal drilling has shown great promise to expand the play outside the current economic limits. The thermal history of the basin is an important reason for the success of the Barnett. The thermal history of the Fort Worth basin is directly related to the emplacement of the Ouachita system. Sections of the Barnett bordering the Ouachita front (regardless of depth) have the highest thermal maturity and, hence, the lowest BTU content of produced gas. In the late 1990s, work by Mitchell Energy demonstrated the viability of water fracs in the Barnett play; this development has contributed to a huge acceleration in Barnett leasing and drilling activity during the past three years. Also in the late 1990s, Mitchell determined that the previous gas-in-place values for the Barnett were low by over a factor of three. There is approximately 150 BCF/mi² of in-place gas in Newark East field. The realization that the primary completion was only recovering 7% of the gas in place per well spurred the current (and very successful) rework/refrac program under way in the field.

The history of the evolving geologic and engineering concepts

that guided development of the Barnett is a tribute to rare perseverance in the oil patch. And the success of the Barnett play may provide a model for prospecting for other large shale-reservoirs. ■

Biographical Sketch

KENT A. BOWKER is currently exploration manager for Star of Texas Energy Services, Inc., a production company with activity centered in the Barnett Shale play of North Texas. Star of Texas Energy has primary offices in the Austin area with an exploration office in The Woodlands.



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Kent began his career with Gulf Oil in 1980, then moved on to Chevron with the merger. His last assignment with Chevron was in the Nonconventional Gas Business Team where he learned about various coal, shale, and tight-sandstone reservoirs, including the Barnett Shale. He began at Mitchell Energy in early 1998 where he assumed the geological duties on the Barnett Shale team. It was during the two-year period beginning in 1998 that two major events took place in the play: the perfecting of water fracs in the Barnett, and development of a true understanding of the gas in place (which is nearly four-times higher than thought previously). With the sale of Mitchell Energy to Devon, Kent moved on to Star of Texas Energy.

Kent is a licensed geologist in Texas and Wyoming and is a member of AAPG (where is currently an associate editor of the *AAPG Bulletin*), RMAG, and SPE. He has published numerous papers covering the history of geology, enhanced-recovery projects, and the geology of several conventional and nonconventional reservoirs.