

by *Lee Billingsley*
Vice-President for
Abraxas Petroleum
Corporation and
current AAPG President

January Meeting Preview

Exploiting the Devonian Reservoir in Oates SW Area, Western Delaware Basin, Texas

The Oates SW field area is located in southwestern Pecos County, Texas, in the southwestern portion of the Delaware basin. The dominant producing reservoir in the area is simply called Devonian, but it is probably Devonian-aged chert in the Thirtyone Formation. Regional structure is NE dip into the basin with some NW-SE trending faults. The Oates SW area is flanked by large structural closures that have produced gas from the Devonian and adjacent reservoirs. These fields include: Perry Bass, 26 BCF from nine wells; Oates NE, 266 BCF from 25 wells; and Pikes Peak, 48 BCF from eight wells.

In contrast to the surrounding fields, Oates SW consists of four small structural closures that vary in size from about 320 to 1280 acres. Abraxas acquired 3-D seismic data to refine the structural interpretation and guide potential horizontal well bores. Each closure has from one to three vertical wells, with each well producing from 0.2 to 2.4 BCFG from the Devonian chert. Production from each vertical well near the top of closures roughly correlates to Devonian reservoir quality determined from log analysis. However, a comparison between calculated original gas-in-place and actual production for each closure indicates a relatively low recovery factor. All the vertical wells exhibited high rates of water production late in their productive history.

Abraxas has drilled three horizontal well bores within the Devonian chert on separate closures. Results span the spectrum of potential outcomes. The best well has produced at a constant rate of 8 MMCFD and the worst well only makes 150 MCFD. The third well is a re-entry of a vertical well, which had produced 1.8 BCFG. Abraxas drilled horizontally within the Devonian chert. Initially, the well produced 100% water, but gas rates eventually increased. Currently, the well produces at relatively constant rates of 700 MCFD and 4000 BWP. The source of the water production is unknown. It could be from: 1) near well bore, but not from the Devonian interval, 2) micro-fractures within the Devonian that are connected to deeper water sources like the Ellenburger, or 3) near well bore water coned upward during production from the vertical well bore.

Detailed correlation of logs indicates an unconformity at the top of the Devonian chert. Consequently, the porous Devonian chert interval is thinner in structurally high wells. This interpretation may explain the variable reservoir quality of the three wells, based on the projected trajectory of the horizontal well bores.

As with other horizontal Devonian chert fields, results are highly variable from well-to-well. Overall the economics of the play in Oates SW have been favorable, but much still needs to be learned in order to repeat the success. ■

Biographical Sketch

LEE BILLINGSLEY received a BS in Geology from Texas A&M in 1975, an MS in Geology from the Colorado School of Mines in 1977, and a PhD in Geology from Texas A&M in 1983. He began his oil and gas career in 1976 with Tenneco Oil Company in Denver, and later worked with American Quasar Petroleum (Denver) and Monterrey Petroleum Corporation (San Antonio). From 1983-1998, he was President and Founder of Sandia Oil & Gas Corporation, until joining Abraxas Petroleum Corporation in 1998. He is currently Vice-President of Exploration.



Dr. Billingsley is a member of many regional and national professional societies, and he has received numerous awards including the AAPG Distinguished Service Award (1997) and Certificate of Merit (1999), as well as the GCAGS Distinguished Service Award (1998). He served as President of the South Texas Geological Society (1985-86) and as General Chairman of the 2004 GCAGS Convention in San Antonio. Within AAPG, he has held several positions including Treasurer, member of House of Delegates, Associate Editor of the *Bulletin*, and Division of Professional Affairs Secretary. Currently, he is AAPG President (2006-2007).