

by K.W. Schmidt, L. P. Goldstein, D. W. Holmes,
M. A. Dablain, C. D. Sharp, and T. L. Jensen

*Pioneer Natural Resources
Irving, Texas*

Evolution of Pawnee Field (Edwards Formation), Bee County: A Horizontal Love Story

The Lower Cretaceous Edwards Formation associated with the Pawnee Field in south Texas has historically been developed through the drilling of vertical wellbores. However, lateral and vertical reservoir heterogeneity suggested the field held significant potential for additional reserves through development by horizontal drilling.

Since 1996, 15 horizontal wells have been drilled in the Edwards reef complex with varying results; 12 of the 15 wells have been completed since November 1999. Before and during this on-going development program, a multi-disciplined approach was used to integrate geophysical and geological interpretations, core analysis, reservoir engineering data, and drilling and production information to construct a coherent but evolving picture of the Edwards reservoir.

Early attempts were made to optimize horizontal wellbore orientation and targeting with emphasis on porosity distribution. A mix of fracturing and porosity development had always been considered critical to successful production in

Pawnee Field, with earlier horizontal wells targeting the highest available porosity. Porosity-based maps, however, exhibited little correlation to recoverable gas volumes. Study of the available cores indicated that the best porosity-permeability relationship was found in the reef-detritus grainstone facies, and that fractures were a much more significant factor than previously thought. Subsequent attention shifted away from porosity toward fracturing and facies distribution as the key aspects that impact production. Current activity focuses on mapping reservoir facies and characterizing the orientation and density of open fractures.

Biographical Sketch

KEVIN SCHMIDT is a staff petrophysicist and exploitation geologist with Pioneer Natural Resources in Irving, Texas. Prior to joining Pioneer in 1999, he spent eight years with Union Pacific Resources as a roving project petrophysicist and as a geologist in Austin Chalk operations and south Louisiana exploration. He holds a BS and MS in geology and an MBA from Texas Christian University. □