

New Plays in an Old Play: 3D AVO Successes in the Vicksburg of South Texas

Mark E. Gregg and Charles T. Bukowski Jr.

Edge Petroleum Corporation, Houston, Texas

In 1995, Edge Petroleum began exploring the mature Vicksburg trend in South Texas with the aid of a speculative 3D seismic survey. Our initial exploration campaign focused on drilling untested compartments in the faulted section and met with limited success. In 1997, after the drilling of two seemingly identical structures resulted in a success and a dry hole, we conducted a seismic modeling study that indicated an AVO anomaly should be associated with the pay interval. Based on this prediction, we reprocessed the 3D data and generated angle stack volumes. Approximately 320 square miles of angle stack volumes were integrated with productive well data and analyzed using seismic interpretation software including visualization tools. This analysis showed that about half of the commercial wells were associated with AVO anomalies

and about two-thirds of drilled AVO anomalies were productive.

Encouraged by these findings we identified numerous prospective anomalies. In our subsequent exploration program we drilled nine AVO-supported wildcats resulting in seven commercial successes. A typical discovery encountered a high-quality reservoir with an areal extent closely matched by the associated AVO anomaly. Two of the discoveries had stratigraphic trapping components and may not have been identified without the use of AVO. Thus, the AVO tool has allowed us to explore for new gas accumulations in a mature trend with a high rate of success.

Note: The full manuscript of our AVO work in the Vicksburg will be published under the title "Developing an Exploration Tool in a Mature Trend: A Class 2 AVO Case Study in South Texas," in *The Leading Edge*, v. 17, no. 11.