

Loma Vieja Field: Structural Geology and Related Velocity Fault Shadow in the Upper Wilcox (Fandango) in South Texas

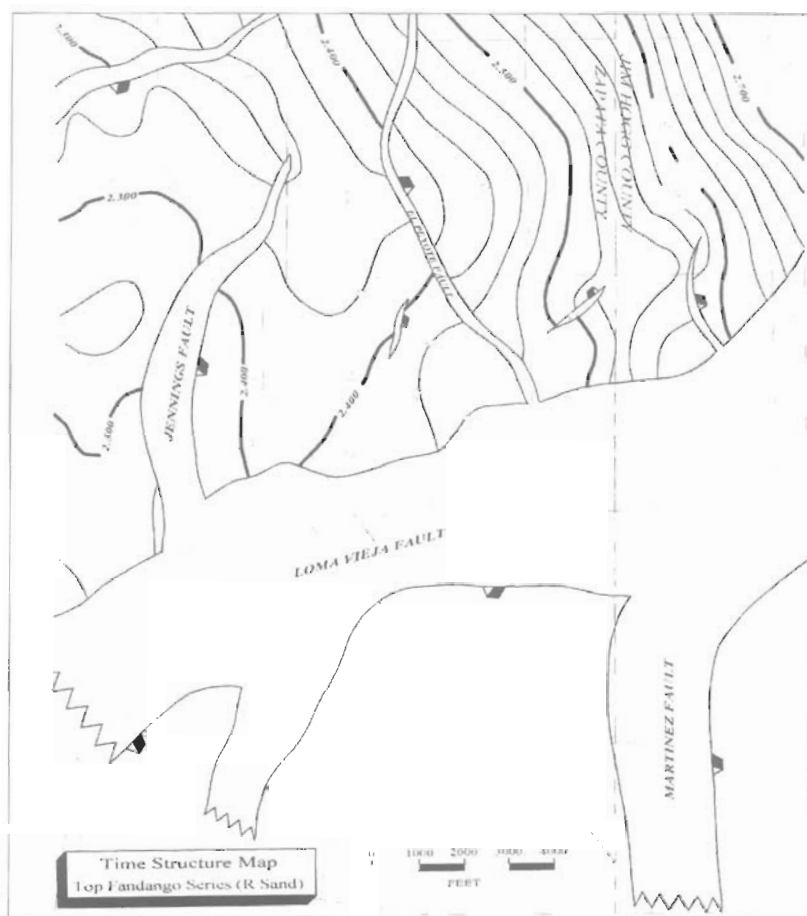


Figure 1. Time structure map at the top of the Fandango series (top R sand), Loma Vieja field.

A new Upper Wilcox (Fandango) field discovery was made at Loma Vieja field in 1989 in Zapata County, Texas. Production from the field to date is 44.1 BCF from numerous Fandango sands that trend from Bob West field northward to E. Seven Sisters field.

The principal trapping mechanism for Loma Vieja field is a high side closure against a very large down-to-the-coast fault. The fault trends across Zapata County through Escobas field, which is immediately updip to Fandango field, northward to NE Thompsonville field in northwest Jim Hogg and southeast Webb counties.

The large down-to-the-coast fault that creates the trap for the field has a definitive velocity shadow resulting in a significant time sag on conventional migrated seismic data. Expansion of

Weches, Queen City, and Reklaw shales on the downthrown side of the fault causes major changes in the average and interval velocities across the trapping fault at Loma Vieja field. Seismic data and time structure maps over the field have southeast dip toward the fault (Fig. 1) where actual dip as measured from well log correlations and dipmeter data is northwest away from the fault. Figure 2 is a depth structure map that is significantly different structurally from the time structure map.

Although the field was discovered with 2D seismic data, 3D seismic data confirmed the presence of a velocity gradient across the field and reduced structural risk during continued drilling in the field. However, structural complexities in the geologic section above the Fandango sands have a major impact in the velocity regime across the field. To reduce risk in drilling wells, it is crucial for the explorationist to understand the effects of veloci-

ty in a 3-dimensional domain by considering all structural features, as well as stratigraphic bodies, that may have any effect on the ray paths and velocity of seismic energy.

Biographical Sketch

Jim Meyerhoff is a geophysicist for Samedan Oil Corporation working the Vicksburg, Yegua, Queen City, and Wilcox trends in South Texas. Prior to his 3-year tenure at Samedan, Jim worked

12 years for **Diamond Shamrock** — Maxus Exploration Company and four years at Amoco Production. He has worked various Gulf Coast trends in Texas, Louisiana, Mississippi, Alabama, and Florida throughout most of his career and has done international work in Argentina, Bolivia, and Peru. He received a B.S. in mathematics in 1978 and an M.S. in geology in 1983, both from Baylor University. □

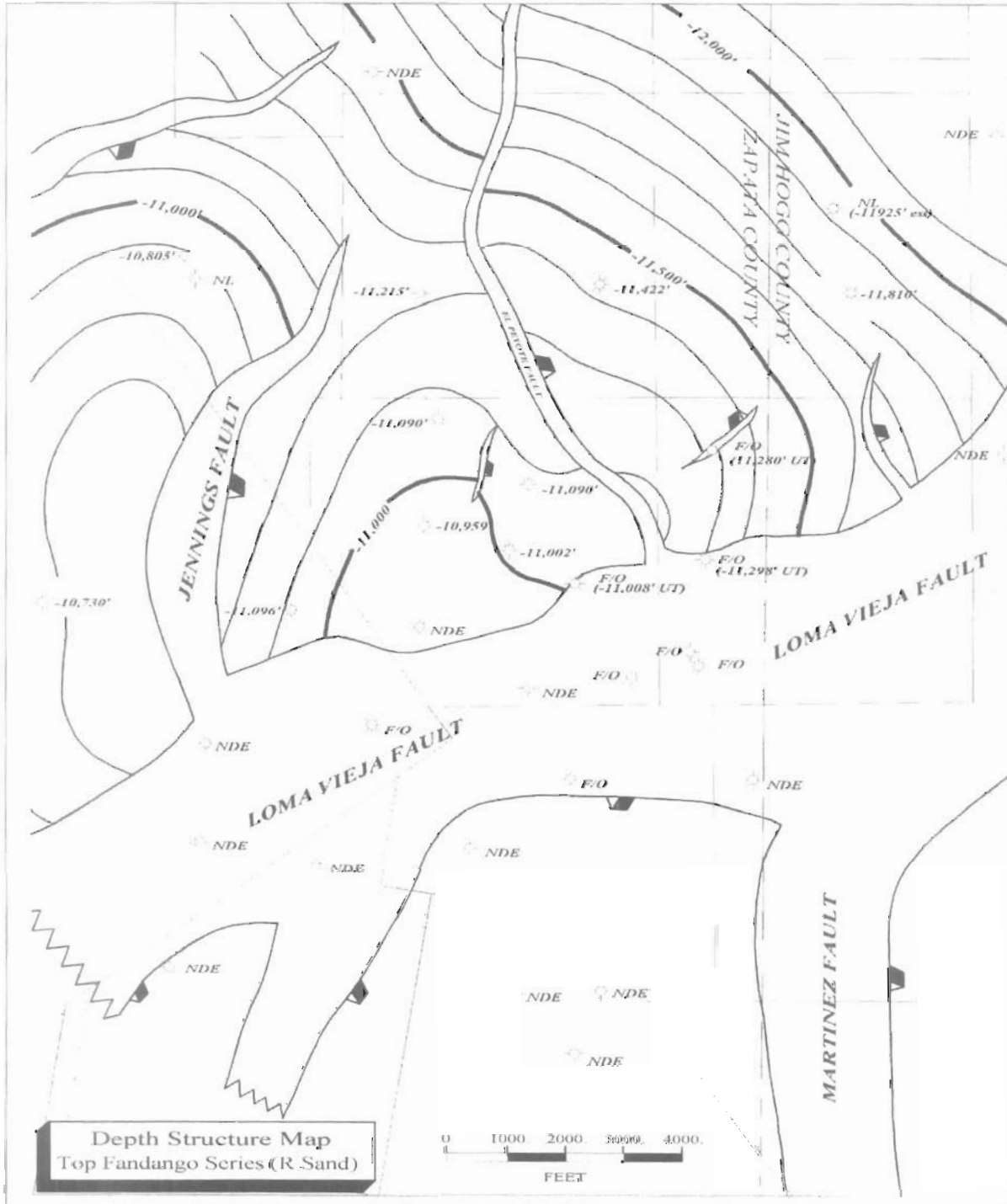


Figure 2. Depth structure map at the top of the Fandango series (top R sand), Loma Vieja field