CONTEMPORANEOUS NORMAL FAULTING AND FOLDING IN WEST WHITE LAKE FIELD, VERMILION PARISH, LOUISIANA

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ABSTRACT

Much of the production in the West White field, Vermilion field, Parish, Louisiana, is from Middle Miocene sands in a structural high on the downthrown side of a contemporaneous, down-to-basin fault (fault D) that cuts through the southern portion of the field. This study deals Primarily with fault D and the productive section in the south half of the field that is Middle Miocene in age. Structural and isopachous maps were prepared for five productive and five nonproductive sands. Isopachous maps were also made for several intervals of shale.

Only productive sands thicken (15 to 39 percent) onto the downthrown side of fault D. Nonproductive sands show only slight thickening (1 to 6 percent) downdip across the fault. The only sand that contains producible hydrocarbons north and south of the fault shows thinning (12 percent) on the downthrown side. Shale bodies show only slight changes in thickness across the fault.

Beds thin over the structural highs along the crest of the West White Lake structure. The thinning is the result of decreased sedimentation over anticlinal highs present at the time of deposition of the beds. The amount of thinning over the structural high on the downthrown side of fault D ranges from 13 to 36 percent for productive sands and 18 to 38 percent for nonproductive sands with both having an average of 22 percent. In the area north of fault D the range in the amount of flank-to-crest thinning is greater for unproductive sands (13 to 62 percent) than in productive sands (22 to 34 percent). However, the average amount of thinning for nonproductive sands (26 percent) is approximately the same for productive sands (27 percent). The amount of thinning in the sand that produces on both sides of fault D is 33 percent north and 24 percent south of the fault. The least amount of flank-to-crest thinning occurs in shale bodies. It varies from 4 to 10 percent north and 6 to 7 percent south of the fault.

The most favorable time for the formation of a trap along fault D was when movement along the fault resulted in (1) a low area on the downthrown side in which thick sands could accumulate and (2) displacement of beds so that sands on the downthrown side abutted against shale on the upthrown side. Even early migrating hydrocarbons would have been trapped in the structural high on the south side of fault D. Sands deposited during times of little or no fault movement were in continuous contact across fault D. Hydrocarbons could accumulate in the structural high south of fault D as well as migrate across the fault into the structural highs on the upthrown side of the fault.

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