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STRUCTURAL COMPARTMENTALIZATION OF LOWER MIOCENE MONTEREY CHERT RESERVOIRS BY TRANSPRESSIONAL FAULT SYSTEMS WITH FOCUS ON FIELD DEVELOPMENT, SANTA YNEZ UNIT, OFFSHORE CALIFORNIA

Major fault systems compartmentalize column heights (ranging between 700 to 3,300 ft) in the Lower Miocene Monterey reservoir. The Monterey is a fractured chert reservoir (~1,700 ft thick) with dolomitic marls, phosphatic shales, and sandstones. A data set including 3D seismic, >4,500 ft of core, FMI images of >75 wells, and production data from >100 wells exists. A regionally extensive, NE/SW trending penetrative conjugate fracture network occurs in the main fault compartments. Secondary fracture networks also developed in response to thrust faulting and bending moment tension/flexural slip of beds during folding. Fracture variability controls production trends of the reservoir.

The Hondo and Pescado uplifts are expressions of recent (last 6 Ma) tectonic activity along several major NE/SW trending fault systems. These faults are interpreted as the major components of a contractional wrench system. The uplifts developed at restraining double bends along each fault by progressive displacement and stacking along a series of thrust imbricates. The main wrench zones and secondary faults that formed at restraining bends, partition the area into tectonic blocks.

Field contacts are different across the tectonic blocks and the fault network seems to control them. At structural crest positions, the Monterey reservoir sequence is displaced only a few hundred feet along these faults. Thus, the hydrocarbon columns are not controlled by cross fault juxtaposition of seals and resultant leak points across the faults. Since the faults cut through the hydrocarbon accumulations across which differential columns/contacts are sealed, it appears that the fault/gouge zones differentially seal hydrocarbon contacts.