Hydrocarbon Traps and Structural Style in a Transpressional Belt: The San Andreas Fault and Deformed California Oil Basins Can Provide Exploration Guidance along The Sagaing Fault and Adjacent Fold Belts, Myanmar

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ABSTRACT

The Sagaing Fault (SF) and San Andreas Fault (SAF) plate boundaries have a number of structural similarities that can assist future resource development in Myanmar which is less explored than California. Both faults have ~300 km of right-lateral displacement since the Early Miocene with adjacent young fold belts and older structural events that provide a variety of traps styles. Both the SF and SAF and their fold belts are seismically active with similar deformational rates, and deform active and prolific petroleum systems. The SAF and the onshore portions of the SF are oblique to the direction of motion between their adjacent tectonic plates and the dominant hydrocarbon trap style is transpressional. Along the SAF two models have been used to explain the strain and trap formation: (1) the wrench model that results from a high shear strength fault (Wilcox, et al., 1973), and (2) strain-partitioning along a weak fault (Mount and Suppe, 1987) that is characterized by pure strike-slip with development of an adjacent fold and thrust belt with little or no strike-slip component (Namson and Davis, 1988a). Anticlinal and fault traps are common to both models, but the kinematic and geometric characteristics of the traps and their structural framework are dissimilar. This results in very different subsurface interpretations, exploration prospects, and subsequent development approaches. Exploration drilling, oil field development, and reflection seismic data strongly support the strain-partitioned model along the SAF (Namson and Davis, 1988a), and has guided several successful resource efforts during the last three decades (Gordon and Gerke, 2009; Davis and Namson, in press). The geologic input of these efforts incorporated many of the structural models and techniques used in classic fold and thrust belt exploration, but have been slightly modified to deal with the multiple deformational events common along plate boundaries and California's active petroleum system. In California we use geometric and kinematic fault-ramp fold models integrated into restorable cross sections and reflection seismic lines to provide a realistic, testable, and economically successful methodology for basin exploration and oil field development.