
Geoscience Applications to Economic Development of a Relatively Shallow, Low Gravity, Structurally Complex Eagle Ford Oil Development, Atascosa County, Texas

Lee Billingsley¹, Bill Layton², and Luke Finger²

¹Windridge Oil & Gas GP LLC, 518 N. Main St., Boerne, Texas 78006

²Abraxas Petroleum Corporation, 18803 Meisner Dr., San Antonio, Texas 78258

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ABSTRACT

Development of the Eagle Ford oil accumulation in South Texas may generally be divided into two gradational trends, black oil and volatile oil. The black oil trend is characterized by: shallower depth, thinner Eagle Ford interval, lower gravity oil (<35°), lower gas-oil ratio (GOR < 1000:1), and generally poorer economic returns than the volatile oil trend. Many areas of Eagle Ford development are also structurally simple with only regional basinal dip. However, Abraxas Petroleum Corporation is developing an area in the black oil trend that is structurally complex due to graben faulting and resultant folding. Because of the faulting during Eagle Ford deposition, the Eagle Ford interval expands from about 100 ft thick outside the graben to about 180 ft within the graben. The expanded interval provides opportunity, but economic development in this part of the trend requires extreme attention to detail and coordination between geology, geophysics, drilling and completion.

Interpretation of the 3D seismic dataset over the field area requires drastic geologic assumptions in order to accurately convert to depth. Velocity values based on the drilling and geosteering of nine, widely spaced horizontal wells indicates that velocity is faster near the downthrown side of growth faults. Improved interpretation of the 3D seismic data has resulted in improved geosteering of the horizontal wells.

Stratigraphically, the Eagle Ford was divided into 13 parasequences in an attempt to determine if certain intervals had different characteristics during frac treatments and resulting productivity. Frac gradient plots indicate that areas near faults have subnormal gradients, but position within the Eagle Ford does not exhibit a consistent trend. However, well performance relative to Eagle Ford completion interval does indicate a correlation.

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