Facies and Stratigraphic Interpretation of the Eaglebine Play in Central Texas

Sridharan Vallabhaneni[1], Thomas D. Olszewski[1], Michael C. Pope[1], and Zoya Heidari[2]

[1]Department of Geology and Geophysics, Texas A&M University,
MS 3148, College Station, Texas 77843, U.S.A.

[2]Department of Petroleum and Geosystems Engineering, University of Texas at Austin,
200 E. Dean Keeton St., Stop C0300, Austin, Texas 78712, U.S.A.

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ABSTRACT

The Upper Cretaceous in Texas is a proven prolific hydrocarbon system. The "Eaglebine" in Central Texas, which includes both the Eagle Ford and Woodbine intervals, is an emerging play with promising results. However, stratigraphic architecture in this region is poorly understood when compared to that of the Maverick Basin and East Texas Basin. The objective of this study is to narrow the stratigraphic uncertainties of Woodbine–Eagle Ford correlation between the East Texas and Maverick basins and to predict the distribution of sand bodies in the active "Eaglebine" interval in Leon, Madison, Grimes, and Brazos counties by integrating information from available wireline logs and cores. A new stratigraphic interpretation of this region is proposed, and estimates of the petrophysical properties for the potential hydrocarbon-bearing intervals in the study area are presented.

The Buda Limestone–Austin Chalk succession in this study area, which brackets the "Eaglebine," thins westward due to uplift associated with the San Marcos Arch and erosion at the base Austin Chalk unconformity. Wireline log interpretation suggests that Woodbine Group sediments, which are dominantly siliciclastic, are a little over 500 ft (152.5 m) thick updip in Leon County and thins dramatically to 50 ft (15.25 m) downdip in Brazos County. This transition records the Woodbine shelf break in Leon-Madison county area. The unconformably overlying lower Eagle Ford Formation is relatively thick in Brazos and Grimes counties. The lower part of the lower Eagle Ford Formation is carbonate-rich shale with high gamma ray and formation resistivity. This unit has the potential to be a prolific play in Brazos and Madison counties. The upper Eagle Ford Formation in this region is a mixture of siliciclastic and carbonate sediments. The proportion of carbonate sediments gradually increases upwards to the base Austin Chalk unconformity. The sandstones of upper Eagle Ford Formation have good hydrocarbon reservoir potential based on their non-shale porosity values and high sand percentage. This study is focused in the region where stratigraphy of the Buda Limestone–Austin

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Chalk interval becomes complex due to facies transitions. This complexity resulted in several unique and contradicting stratigraphic models. A candid understanding of these local scale stratigraphic and lithological variations from this study is useful not only in understanding the regional scale stratigraphy but also in predicting the distribution of sandstone units.