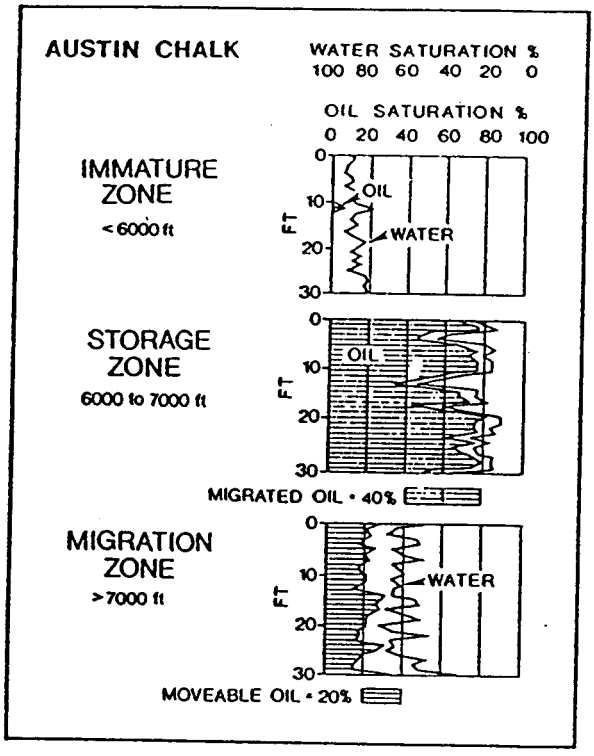

Fig. 13 - The Austin Chalk Oil Generation - Migration Model

formed. The formation of the micro-fractures allows the petroleum to escape from the matrix to nearby tectonic macro-fractures as well as allowing oil generation to continue. Consequently, the migration zone contains less oil and more water. The difference in water saturations between the storage and migration zones suggests that approximately 40% of the oil has migrated whereas about 20% remains in the matrix. The matrix oil appears to have been lost during core recovery and is interpreted to be moveable oil at subsurface conditions. Refer to Fig. 13. Thus, the migration zone contains about 40% of the generated oil in the tectonic fractures, while 20% remains trapped in the matrix.

Studies conducted under the umbrella of this research project have shown the average resistivity recorded in well logs directly reflects the water saturation[6]. The immature zone exhibits average resistivities of less than 10 ohm-m; the storage or accumulation zone exhibits resistivities greater than 40 ohm-m; and the migration zone exhibits resistivities in the intermediate range of 10 to 40 ohm-m. Consequently, it is possible to analysze resistivity logs to estimate the water saturation of a given interval and to predict whether the generated oil is largely retained in the matrix or has migrated to tectonic fractures.