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Affects of Eocene Beach Rock on Reservoir Compartmentalization in Livingston Field: Livingston Parish, Louisiana

Solidification of Recent unconsolidated beach sand into "beach rock" is the apparent result of rather rapid calcium carbonate (CaCO₃) cementation of beach sand grains at the tidal zone. Evaporation of saturated seawater or groundwater flowing through the loose beach sediments is the primary process responsible for the precipitation of the CaCO₃. Petrographically, the resulting rocks are characterized by the presence of a microcrystalline cement matrix (micrite) and less frequently sparite, engulfing terrigenous grains and allochemicals.

The location of many areas of primary beach rock formation, especially in the coastal areas of the modern Caribbean, is well documented. However, occurrences of beach rock in the fossil record have largely been overlooked, neglected, or misidentified, probably because of their apparent lack of economic value and possibly because their recognizable primary beach rock characteristics may have been modified during burial diagenesis. The Eocene upper Wilcox "First Sand Reservoir" in south Louisiana's Livingston Field provides examples of apparent counterparts to the modern deposits. "Hard streaks" with thickness ranges of <0.3 to >4.5 meters, occur widely within the eolian, beach, and shoreface sediments comprising the oil and gas reservoir. These altered zones bear close similarities to many documented modern beach rock examples. Their presence acquire special economic importance as they serve to compartmentalize and provide permeability and porosity restrictions to the vertical flow of hydrocarbons within several areas of the reservoir. Both primary and secondary hydrocarbon recovery from the field have been affected by the distribution of these ancient beach rocks.