

Carbonate Sequence Stratigraphy and Paleoenvironments of the Washita Group (Albian/Cenomanian), Main Pass Field Area, Northeastern Gulf of Mexico

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The Main Pass Block 253 Field, northeastern Gulf of Mexico, is productive of oil from Washita (Albian/Cenomanian) carbonate reservoirs at 8,500 to 8,700 feet. The field is located on Main Pass Blocks 253 and 254 and is situated along the present-day continental shelf margin, which closely approximates the shelf edge during Cretaceous time. This field is significant in that it is productive of oil and demonstrates the oil potential of Lower Cretaceous carbonates in the northeastern Gulf of Mexico.

Core and thin section studies of the Washita reservoir rocks show that these carbonates accumulated as part of a reef-shoal complex in a carbonate rimmed-shelf system. A general progradational trend, which illustrates a pattern of reef shelf margin accumulations to back and patch reef paleoenvironments to middle to inner shelf carbonate deposits is evident. Overall, 10 distinct cycles grading upward from mud-supported bafflestones, wackestones, and packstones to grain-supported rudstones and grainstones are observable in core. These coarsening upward cycles reflect an increase in energy upwards. The boundaries of the cycles are defined by a physical surface of erosion or non-deposition or by an abrupt change in facies. The major constituents in the reef facies are rudists, including caprinids and radiolitids. These organisms are in life position in the lower part of the sequence.

A major unconformity is observed in the core. Washita carbonates are overlain by Campanian/Maastrichtian chalks. The age of the chalks is determined by the presence of age-diagnostic nannoplankton and planktonic foraminifera. This unconformity is probably the regional Mid-Cretaceous Unconformity of the northeastern Gulf of Mexico as recognized on seismic profiles. This unconformity probably contributed to the intense diagenetic alterations of the depositional fabric of the Washita carbonates as seen in core. Diagenetic processes observed in the core include dolomitization, dissolution and karstification.