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Reservoir Alteration at the Mid to Late Cenomanian Unconformity, Falah Field, Offshore Dubai, United Arab Emirates

Falah Field, discovered in 1978, produces from Middle to Late Cenomanian Mishrif limestones. The Mishrif formed on the ramp of the Rub Al Khali basin and conformably overlies the deep shelf Khatiyah organic-rich limestone. The Mishrif top is eroded, marked by a cemented, pyritic limestone about 1 foot thick, and overlain by Turonian Laffan marine shale.

In places a marginal to nonmarine carbonaceous unit ("coal") is found at the unconformity. Detailed biostratigraphic correlations indicate structural growth during and immediately following deposition of the Mishrif, localized by movement of the Late Precambrian Hormuz salt. Domal uplift resulted in erosion of up to 450 ft. of the Mishrif and about 5 my of missing section.

The coal has not been cored but is identified by a high gamma and low density log signature and confirmed by drill cuttings. The coal is up to 8 feet thick; similar material has been encountered in vertically oriented "dikes" penetrated by horizontal laterals in the top of the Mishrif. A seismic anomaly has been mapped that spatially correlates with the presence of coal in the wells.

In the wells with coal, the Mishrif limestone is characterized by a saturation vs. height profile indicative of larger pore throats. We believe that during deposition of the coal the Mishrif fine grainstones were subjected to corrosive groundwaters that altered the pore structure. This alteration has been preserved through later diagenesis and oil emplacement, and is a controlling factor of the saturation profiles and production performance observed in some wells.