

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

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Tide-Dominated Sedimentation in an Arid Rift Basin—Cretaceous Qishn Clastics, Masila Block, Republic of Yemen

Cretaceous Qishn Clastics Member, Yemen, were deposited in a rift basin connected to the Paleo-Indian Ocean - an ideal set-up for tidal amplification and domination. Recoverable hydrocarbon reserves are 1.1 bbl. Facies associations are consistent with an estuarine system – sand shoals, tidally-influenced point bars, mud flats, etc. Lower Qishn onlap resulted in deposition of tidal estuarine to bay facies. A sequence boundary truncates the Lower Qishn at the base of the S3, a low-accommodation braidplain deposited close to the shoreline. A flooding surface at the top of the S3 heralds S2 progradational, tide-dominated deltaic deposits. Delta progradation culminated in clastic dolomitic deposits on the coastal plain. With subsequent transgression, S1C deposits show rising water table and a nonmarine flooding surface, overlain by tidal-flat/inlet deposits. Ongoing transgression resulted in wave-ravinement overlain by shallow shelf clastics and deeper shelf carbonates of the S1B. The overlying S1A comprises bioturbated, clastic shelf deposits related to a drop in sea level. Accommodation was relatively high, except for low accommodation associated with regional sheet sandstone of the S3. Qishn Clastic sediments meet the criteria of a macrotidal, tide-dominated estuary, yet a more appropriate analog is the Tigris-Euphrates River and delta flowing into the Arabian Gulf. Is the latter a tidally-influenced delta flowing into a gulf - or a large bayhead delta? Application of existing terminologies - estuaries, syn-rift clastics, deltaic, strait, Gulf, bay - is confusing to the practicing explorationist, particularly when attempting to convey a mental image of the environmental setting of the reservoir.