Confined-flow Turbidite Reservoirs: Plio-Pleistocene, Ship Shoal – Ewing Banks – Green Canyon areas, Offshore Louisiana

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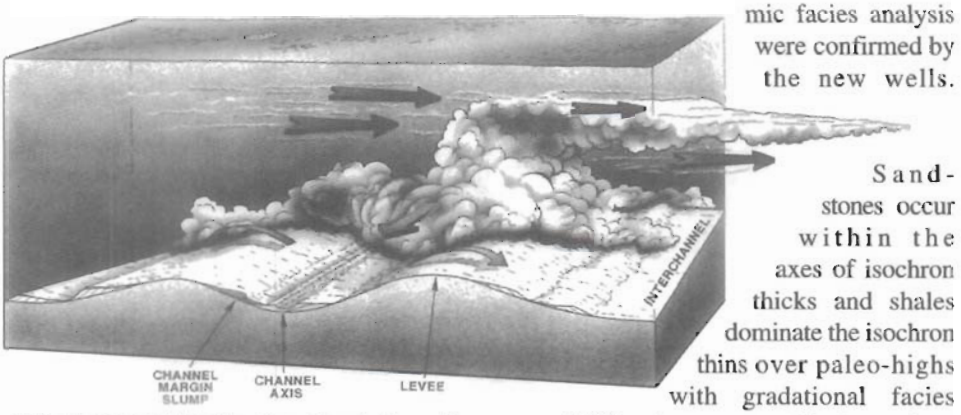
Seismic facies and high-resolution biostratigraphic analysis provide a sequence stratigraphic framework for interpreting lateral distribution of sand-prone facies and possible reservoir connectivity in the Ship Shoal 351-358 to Ewing Bank 988 minibasin, offshore Louisiana. The interval of interest is an isochron thick interpreted as a lowstand systems tract deposited in bathyal water depths within an intraslope-minibasin. This basin is approximately 50 km from the age–equivalent shelf/slope break. The isochron thick was deposited between the late Pliocene *Discoaster pentaradiatus* and early Pleistocene Discoaster brouweri Condensed Sections, as calibrated by data from five wells penetrating this interval within the intraslope basin.



Gulf of Mexico Gravity Flow Event; from Shanmugam (1993, AAPG Bulletin) artwork by Mark Lindsey, Mobil Technology Company.

The *D. pentaradiatus–D. brouweri* sequence consists of the synclinal fill of a salt withdrawal basin forming an isochron thick that thins onto adjacent salt-cored structural highs. This isochron interval was subdivided into four seismic facies and each was calibrated with local well data. Mapped patterns of these seismic facies suggest a network of channel-form systems supplying sediment to depositional lobe-forms within a slope valley. Sandy sediments were transported by gravity-driven processes from the shelf, down slope through a valley and into this local intraslope-minibasin. Upon filling this minibasin, the gravity-driven sediments spilled farther south into the area of the Green Canyon 18 field, where these sandstones are the main reservoir. The mapping of channel-and levee-form patterns suggests that the transport process included turbid flow with consequent overbanking of the channel and levee formation.

Following the above analysis, three wells and two sidetracks were drilled to further test the prospectivity of the area. Rock type and hydrocarbon predictions based on calibrated seismic facies analysis were confirmed by the new wells.

Sandstones occur within the axes of isochron thicks and shales dominate the isochron thins over paleo-highs with gradational facies between. Hydrocarbon accumulation occurs in two settings: 1) channel-fed lobes with blocky log character yield hydrocarbons within areas of structural closure; and 2) overbank facies that contain hydrocarbons in low-resistivity pay both within and outside of structural closure

Local abundance peaks of planktonic microfossils provide correlation control between the four depositional lobes of this lowstand deposit. The biostratigraphic data and paleogeographic interpretation suggest that each depositional lobe is separated from the others by mudstone drapes, resulting in discrete partitioning of reservoir sands.

John M. Armentrout *has a Ph.D. from University of Washington (1973) and a M.S. in geology from University of Oregon (1967). He has been an AAPG Distinguished Lecturer and President of SEPM.*

His current assignment in integrated stratigraphic interpretation at Mobil's Exploration and Producing Technical Center in Dallas began in 1990.

Controversy Ahead at Luncheon Meeting!

John Armentrout, our featured speaker, will comment on interpretation differences between his work and that of fellow Mobil author Shan Shanmugam, who gave an HGS Luncheon talk in March 1997 entitled "Deepwater Exploration: Conceptual Models and Their Uncertainties." At that talk, Shanmugan stated, "Conventional submarine fan models are not applicable in many cases. The common perception in exploration is that deepwater sands are predominately a product of turbidity currents. The reality is that deepwater sands are deposits of sandy debris flows, slumps, and bottom currents rather than turbidity currents."

Armentrout supports the model of turbidity currents. The two models and their differences have been vigorously debated within Mobil while supporting the open discussion of multiple working hypotheses. Shanmugan's research has focused on interpreting process sedimentology from more than 27,000 ft of core description. Armentrout has participated in regional seismic sequence stratigraphy projects including analysis of 3D data.

Note: The reservation code for this meeting is 5-0-5.