Tuesday, May 17, 2005

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Wilcox Depositional Systems: Shelf to Deep Basin

The Wilcox has long been recognized as an important petroleum resource, producing from deltaic, fluvial and shallow marine sandstone reservoirs since the 1930s. Recent drilling in the Perdido Fold Belt (Alaminos Canyon OCS area) has confirmed a new exploration play in the deep basin component of the Wilcox petroleum system, with significant discoveries in distal turbidite systems.

The Wilcox Group in the Gulf of Mexico basin spans much of the Upper Paleocene and Lower Eocene. In outcrop the Wilcox is characterized by a variety of paralic and very shallow marine depositional settings, and is represented by interbedded sandstone and shale plus locally abundant lignite. Updip from the Lower Cretaceous shelf edge, relatively dense shallow subsurface well control allows documentation of fluvial, deltaic and open shelf depositional systems. Downdip from the Lower Cretaceous shelf edge the Wilcox comprises delta front, open shelf, estuarine and widespread prodelta depositional facies. Relatively sparse well control shows a mostly sand poor section for the prodelta and shelf depositional systems. Downdip from the shelf and prodelta, the next Wilcox well penetrations are 250 miles farther in the basin, in the southern Alaminos Canyon OCS area referred to as the Perdido Fold Belt (PFB) in the deepwater Gulf of Mexico.

Recently released drilling data sheds new light on play concepts and hydrocarbon potential of the Perdido Fold Belt (PFB).

Recently released drilling data sheds new light on play concepts and hydrocarbon potential of the PFB. Located in the southern Alaminos Canyon OCS area and extending into Mexican waters, the PFB consists of a series of large, northeast-southwest trending, saltcored box folds containing Middle Jurassic to Holocene clastic and carbonate sequences. Based on regional

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correlations and seismic facies analysis, the initial exploratory targets consisted of fractured Mesozoic carbonates and Lower Tertiary turbidites. Given the absence of local stratigraphic control, the presence, distribution and quality of the reservoir objectives were considered to be among the most significant risk elements for the trend. A key result of the BAHA wells (AC 600 #1 and AC 557 #1) was documenting a thick (>4000 ft) progression of Lower Tertiary sands and establishing the presence of extensive Wilcox equivalent turbidite sands located greater than 250 miles down dip from their fluvial and deltaic equivalents. Sand character and distribution interpreted from wireline logs and seismic data demonstrate a systematic progression from regional basin-floor fans to distal turbidite channel/levee systems.

Since the deep test at BAHA in 2001, six additional deep wildcats have been drilled in the Perdido Fold Belt, including announced discoveries at Trident (AC 903 #1) in 2001, Great White (AC 857) in 2002 and Tobago (AC 859) in 2004. Additional wildcat wells in the PFB include Tiger (AC 818) and Toledo (AC 951) in 2004, both with status not released, and Diamondback (AC 739, drilling).

Success in the PFB also promoted extension of the Wilcox trend an additional 200 miles to the east, in Walker Ridge. Wildcat discoveries in Walker Ridge include Cascade (WR 206) in 2002, Chinook (WR 425) and St. Malo (WR 678) in 2003, and Jack (WR 759) in 2004. Additional wildcat wells in the eastern extension include Sardinia (KC 681), Hadrian (KC 919), Das Bump (WR 724) and Stones (WR 508, drilling).

With continued success and growing interest in the trend, the Perdido Fold Belt is likely to become an increasingly important exploration and development play in the deepwater Gulf of Mexico. ■

Biographical Sketch

Larry Zarra has a BA degree (1979) from Rutgers College and a MS degree (1988) from the University of Delaware, both in geology. He worked for The Academy of Natural Science in Philadelphia, the North Carolina Geological Survey and Exxon, before joining Chevron in 1991. At Exxon and Chevron, Larry focused on Texas Gulf Coast foraminiferal biostratigraphy and sequence stratigraphy. He is a member of AAPG and GCSSEPM, and has recently co-authored talks and abstracts at AAPG and the 2003 GCSEPM Research Conference. Larry is currently a stratigrapher and regional geologist for ChevronTexaco's deepwater Gulf of Mexico Exploration Team. His primary interests include integrating sequence stratigraphy, seismic geomorphology, sedimentology, image logs and cores to better understand and predict deepwater depositional processes and systems.