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From Imaging to Production: Development of a Shallow Transgressive Sand Sheet Reservoir, Offshore Louisiana

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A striking amplitude anomaly was revealed on a block held jointly by Texaco and a partner during workstation analysis of 3-D seismic data. The shallow (0.5 sec) seismic event was correlated to the upper portion of a 1,300-foot sub-sea complex of sand lobes. Sequence stratigraphic and stacking pattern analysis of logs pointed to a Late Pleistocene transgressive sand sheet origin for the thin sand at the top of the complex which exhibits a high-resistivity gas signature in several wells at the periphery of the amplitude. The sand, informally called the Z1 member, is capped by a flooding surface and vertical seal candidate, the seismic Z horizon.

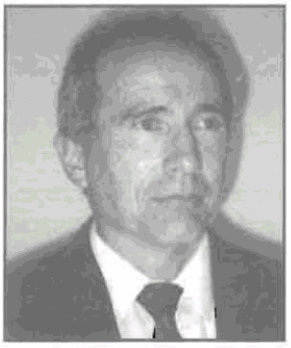
Seismic amplitude mapping of the Z horizon and seismic stratal slice amplitude mapping at intervals through the Z sand complex revealed a pattern consistent with deltas aligned along a former river system. The mapped deltas are most probably the result of retrograde (landward) delta lobe migration in response to rising sea levels. The Z1 transgressive sand sheet is interpreted, based on modern analogs, as containing several facies related to the sub-environments of delta lobe destruction and flooding during rapid marine transgression.

We concluded that the strength of the mapped amplitudes over the prospect varies primarily in response to differences in the tuning thickness of the gas-filled Z1 sand. Thus, the best amplitudes determine locations where the transgressive sand sheet is thickest and the sand quality is best. This stratigraphic insight caused us to select the Z1 sand as a low-risk, low-cost candidate for horizontal drilling and completion. Modern transgressive deposits suggest a P-90 sand sheet thickness on the order of 20 ft.

A pilot hole drilled prior to the first horizontal well found 18 feet of gross sand and 11 feet of gas. Our first production well reaches 1,500 feet horizontally and penetrates 1,100 feet of net gas. Initial production is in the range of 14 MMCF per day. We hope to achieve an ultimate recovery of 15 to 20 BCF for the project.

Biographical Sketches

Lillian G. Flakes is a geoscientist in the Offshore Division at Texaco Exploration and Production, Inc., New Orleans. Lillian completed her B.S. degree in Mathematics at Spelman College in Atlanta, Georgia in 1987 and her M.S. degree in Geophysical Sciences from Georgia Institute of Technology in 1990. Lillian joined Texaco in 1990 and has worked as a development geoscientist in the Gulf of Mexico. She has worked on the Offshore Division's trend study team charged to develop strategic opportunities for exploration. Currently, she focuses on field revitalization of core assets and is a member of the shallow gas development team.



Richard H. "Dick" Fillon is currently a member of the Texaco Offshore Division's shelf exploration team headquartered in New Orleans. Dick earned a B.S. degree from Rensselaer Polytechnic Institute in 1966, an M.S. in 1970 from the University of Vermont, and a Ph.D. in 1972 from the University of Rhode Island's Graduate School of Oceanography, completing a dissertation on Antarctica's Ross Sea. He began his career in the petroleum industry with Chevron Geophysical Company in Houston and Chevron Oil Company in New Orleans. He has also been with the University of South Carolina's research faculty, Woods Hole Oceanographic Institution, and Texaco's geological laboratory. ■