Abstracts

The "Up-dip" Norphlet Trend: A Re-vitalized Target for Exploration in Southwest Alabama

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A combination of inland dune and wadi-style deposition of alluvial sands and gravels is providing a re-vitalized play to the Norphlet Formation (Jurassic) of southwest Alabama. In the same area where operators were successful several years ago in establishing Frsico City (Haynesville) reservoirs in pinchouts high on basement structures; recent drilling lower on the flanks of these same structural complexes is providing similar results.

Facies interpretation of conventional core data and 3-D seismic each play a very important role in making this rend economic and attractive. High well success rates and test rates ranging from 300-500 barrels of oil and 1000 MCF gas per day make these 11,000-12,000 foot targets a viable exploration venture.

The Norphlet reservoirs are composed of a fining upwards succession of gravelly alluvial fans, braided streams and ephemeral (1-6 foot thick) eolian dunes. This continental sand and gravel assemblage was re-woked during subsequent Smackover transgression. A thin upper Nophlet fan delta and coastal tidal flat facies is recognized beneath and interfingering with basal laminated lime muds of the lower Smackover Formation.

The most attractive reservoir properties have thus far been located in the eolian dune and re-worked shallow marine environments. Marine carbonate cementation in the upper sands, and differential compaction in the lower gravelly sands are the primary distructional aspects to reservoir porosity and permeability. In addition, the localized occurrence of unstable volcanic rock fragments provide a source of authigenic clays which require consideration during completion techniques.

Fluvial Deposits and Leaky Aquitards of the Late Pleistocene Shallow Subsurface in Southwest Louisiana

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Shallow subsurface Pleistocene deposits underlying southwest Louisiana exhibit multiple cycles of fluvial deposition, each herein referred to as a fluvial system. The fluvial systems are discernible in a geologic model that reflects correlations and facies analysis on a scale of approximately 200 to 300 feet. The fluvial systems consist of point bar, channel-fill, levee, crevasse splay and flood plain facies. Channel sequences up to 60 feet thick are composed of several fining-up sandy sequences each on the scale of 10 feet thick. Lateral to the upper portions of the channel sequence are sediments interpreted as crevasse splay deposits. Marsh and estuarine deposits representing flooding surfaces cap these fluvial cycles. Relatively thin, clays deposited on aggraded floodplains overlie some fluvial cycles. Laterally persistent flooding surfaces are locally eroded by successive channels.

Fluvial systems exhibit distinctive hydrologic characteristics with similar water levels in each system. These systems form a leaky aquitard overlying the Chicot Aquifer. Factors responsible for the leaky nature of the clay-rich section are: 1) fractures in the clay-rich flood plain deposits that increase the vertical permeability, 2) scour of fluvial systems that erodes thin, relatively impermeable, fine-grained organic-rich sections capping the sequences causing vertical connections between different systems and 3) stress caused by water withdrawal from the underlying aquifer. Well-developed, highly permeable point bar sequences act as reservoirs and connect thin permeable, silty layers ubiquitous in these fluvial and interfluvial deposits. This discussion will illustrate the model with data acquired from a roughly one square mile study area.