

## APPROACHES TO FINDING NEW GAS IN MATURE FIELDS: AN EXAMPLE FROM THE MIDDLE FRIO, ONSHORE TEXAS GULF COAST BASIN.

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### ABSTRACT

Refined depositional models of reservoir distribution applied to new and previously acquired data sets (reflection seismic, well logs, and core) can lead to potential infield opportunities. Conventional 2-D seismic and well logs are standard industry tools utilized as part of many exploration and field-development programs. Reflection seismic lines across a 50-yr-old gas field along the Vicksburg fault trend of the Gulf Coast Basin in a non-marine portion of the Oligocene Frio section, were interpreted with emphasis on changes in waveform character. A comparison of velocity-only derived synthetics to velocity/density derived synthetics show a close similarity. Observed amplitude variations are non-fluid related but are lithology and thickness dependent. Synthetic seismograms constructed for well logs and tied to conventional reflection seismic lines were correlated with stratigraphic cross sections and facies maps. Standard resistivity logs, typically available for all well control, can be digitized to create pseudo-synthetics for well to seismic correlations where velocity and density logs are unavailable. Observed patterns of variation in seismic character were linked to geologic interpretation from well logs. Seismic variations range from single waveform peaks (15 milliseconds) that correspond to isolated 45 ft+ channel complexes to zones of 3000 ft wide convex reflections (40 milliseconds or 200 ft thick) that correspond to variable lithologic patterns across part of the field. Both vertical and lateral transitions from sandstone-rich amalgamated channel sequences to sandstone-poor non-channel areas are the dominant explanation for reflection contrast. High amplitude reflectors are mappable along a 2-D grid with an approximate 2000 ft spacing. Comparison of known gas productive intervals at moderate depths (4000 to 7000 ft) from the existing well control with the detailed geologic and seismic interpretation reveals a combination of potentially untapped and partially drained portions of multiple reservoirs that warrant consideration for infield drilling or recompletion. Combined interpretation of well logs, reflection seismic data, and production information is a simple, cost-effective approach to utilizing standard tools and information in a mature field to locate opportunities for incremental gas recovery.

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