

Channel Delineation in the Lower Wilcox Formation, Southeastern Texas: Integrated Seismic Data, Well Logs, and Modeling

Robert V. Schneider¹ and Michael E. Ellis²

¹Department of Physics and Geosciences, Texas A&M University,
MSC 175, 700 University Blvd., Kingsville, Texas 78363–8202

²Threeway Resources LLC, 16600 Park Row, Houston, Texas 77084–5019

Abstract

A 3D seismic data volume was acquired in southeastern Texas to delineate potential sand channels along the thalweg of a Lower Wilcox offshore canyon. The target channels were interpreted to be Paleocene Lower Wilcox in age, discovered by drilling from 2D seismic data. Two previous wells were drilled to the northeast of this well but failed due to missing reservoir rock. Acquisition parameters for this survey were modified to satisfy environmental regulations at the project site. The resulting volume yielded prestack gathers that were of varying near-to-far offsets, and when stacked left a dead trace for every other crossline. The processing of this volume yielded suboptimal image results due to the data being filtered then interpolated through the dead traces. In effect, the geology was removed from the volume before interpretation could begin. Pre-stack migrated gathers were used to restore the geology to the reflectors by re-stacking without interpolation through the dead traces. Results revealed reflectors consistent with stratigraphy at both the producing well and dry holes. Subsequent manual line-by-line analysis yielded the image of meandering sand channels along the canyon thalweg. From this image, the producing well was seen to intercept a channel proximal to the canyon wall. Reflector character was tested by forward amplitude modeling based on log data at each well. Synthetic results were then compared to gather reflectors at the three well sites. Results revealed that amplitude character could only be reliable at locations where channels intersected to make stacked sand plays. Fluid substitution in the models showed that a gas signature was found where channels stacked to a thickness greater than 30 m (100 ft). This character was shown to be present at the producing well but absent at the dry holes. A revised set of drilling target locations was then proposed.