

A Seismically Defined Ancient Anoxic Intraslope Basin in Hardin County, Texas—Potential Source and Seismic Pitfall

Blanke, Steve ¹; Meibos, Lynn ¹; Kline, Paul ¹ (1) Anadarko Petroleum Corp., The Woodlands, TX.

In 2007, Anadarko Petroleum Corporation identified a seismic amplitude anomaly within a proprietary 3D seismic dataset in western Hardin County, Texas. The anomaly consisted of a strong trough-led amplitude event exceeding 25,000 acres, or 39 square miles in area contained within a large, salt-induced intraslope basin in the Paleocene Middle Wilcox interval. Based upon the observed geometry, structural configuration and seismic attributes, the exploration team believed it to represent an intraslope basin floor fan deposit and proposed a test within the presumed major feeder channel axis, along the updip margin of the anomaly. Using a nearby producing analog within approximately the same stratigraphic interval as an analog, a high quality potential pay thickness of 150 feet was modeled as the prospect's primary objective. Upon drilling, however, this interval was found to consist of 400 feet of black, organic-rich shale. From post-drill evaluation, it became apparent that the observed anomaly corresponded to a low density, low velocity interval attributed to high levels of organic content, exceeding 8% TOC in some sidewall core samples. Such sediments are seen today in hypersaline, anoxic environments such as the Orca Basin in the deepwater Gulf of Mexico, where exposed salt at the seafloor has sourced a large density-stratified brine lake. Flattening of the seismic dataset suggests that a similar salt geometry was likely present during the deposition of this shale interval. Other such shale bodies might be expected within the Wilcox section and may provide not only a new, though limited, potential source rock interval, but also a potential seismic pitfall to the play.