Exploration Scheme for the Wilcox Group in Central Louisiana: Detailed Structural/Environmental Mapping with Well Logs Followed by Interpolation/Extrapolation with High-Resolution Surface-Sourced Seismic Data

Gary L. Kinsland[1], Anne C. Brennan[2], and Nathan Quick[3]

[1]University of Louisiana at Lafayette

[2]Drillinginfo

[3]Geosyntec Consultants

EXTENDED ABSTRACT

The fluvial to near-shore marine Wilcox Group strata of central Louisiana have yielded oil and gas for about 100 yr. Several shallow, 500 to 1000 m (1600 to 3300 ft), fields have been found, developed and depleted, some are still producing. This was accomplished by exploratory drilling and impressive geological reasoning. Seismic data have been of little to no help in these endeavors as the target strata are typically too shallow, too thin and/or too narrow to be imaged in the standard industry shot-hole or vibrator data which are designed to image deeper, larger targets. The fields/traps are often aerially small and the region is under-sampled by drilling, i.e. the typical spacing of non-field wells far exceeds the spacing necessary to find all of the structural/stratigraphic traps likely to exist (Figs. 1 and 2).

Kinsland et al. (2016) imaged Wilcox Gp. strata in LaSalle Parish with high resolution surface-sourced seismic data. These data have been reprocessed (Mao, 2017; Ghalayini, 2018). The data image to the base of the Wilcox strata, approximately 1000 m (3300 ft) with resolution, vertical and horizontal, sufficient to resolve the strata and productive facies. Quick (2018) demonstrated that the Wilcox strata may be tied to these seismic data by utilizing the resistivity log data from two adjacent wells, for which there are no sonic data, to create synthetic seismograms. He calibrated the algorithm used to create the synthetic seismograms by utilizing wells in the surrounding area which do have both resistivity and sonic logs. …

Kinsland, G. L., A. C. Brennan, and N. Quick, 2019, Exploration scheme for the Wilcox Group in central Louisiana: Detailed structural/environmental mapping with well logs followed by interpolation/extrapolation with high-resolution surface-sourced seismic data: GeoGulf Transactions, v. 69, p. 373–382.