

# Continuous Development of Geologic Models for the Wolfcamp and Spraberry Formations, Southern Midland Basin, West Texas

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## Abstract

In this work, we focus on constructing a three-dimensional, faulted geocellular model from the southern half of the Midland Basin. This study takes advantage of recent analysis from both the Delaware and Midland Basins regarding facies types, and geobody orientations and geometries. In addition, to reflect the spatial and temporal southern Midland Basin evolution, the margins have been expanded according to the likely coeval structural framework, although these may not necessarily correspond with the basin depositional boundaries. The current study incorporates stratigraphic correlations from over 1800 wells, facies interpretations from about 600 wells, and petrophysical analyses from almost 900 wells. The well data in the model has been distributed over 1030 layers within the Wolfcamp and Spraberry interval to provide a dense dataset for variogram evaluation and simulation modeling. The final results for porosity, water saturation, formation volume factor, etc., should be useful to augment field-scale resource assessments. Deposition of the Wolfcamp formation appears to have been impacted by an existing topographic high along the eastern margin of the Central Basin Platform, possibly caused by syn-depositional uplift along that margin. While the greatest thicknesses of Wolfcamp D through B intervals are located near the center of the basin, the depositional axes of Wolfcamp A and the overlying Dean are shifted westward. There is some evidence from well control that the Wolfcamp D through B intervals thicken on the down-thrown side of major east-

west trending faults. However, by the time of Wolfcamp A deposition, fault-associated thickening was minimal, and most topographic highs along the western margin appear to have been surpassed. Deposition of the Dean interval is much more basin-centered than Wolfcamp A, and former highs along the Central Basin Platform and Eastern Shelf are again accentuated. Siliciclastic facies are generally subordinate to carbonate facies in the Wolfcamp, whereas siliciclastic facies occur with greater frequency in the Spraberry. Based on facies interpretation and well control, siliciclastic deposits have a dominant north to south orientation, while carbonates show preferential east to west trending deposition. Carbonates deposits likely exhibit a sediment provenance from the western, Central Basin Platform margin throughout most of the Wolfcamp to Spraberry interval.