ABSTRACT: Stratigraphy of Pennsylvanian Detrital Reservoirs, Permian Basin

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Significant oil reserves have been found to date in stratigraphic traps in Pennsylvanian detrital reservoirs on the Central Basin platform and Reagan uplift of the Permian basin. The 32 MMBOEG Arenoso field area, discovered in 1966, is the largest producing field. Along a 75 mi northwest-southeast trend, 23 other smaller fields will produce an average 850 MBOEG each, for a total estimated ultimate recovery to date in the trend of 52 MMBOEG. These stratigraphic traps are elusive and complex. However, reservoir quality is excellent, and because of the poorly understood trap types, significant reserves remain to be found in the trend.

The Pennsylvanian detrital consists of chert cobble conglomerates, coarse sands, red shales, and gray limestones deposited in an environment that grades seaward from alluvial fan to braided stream to shallow marine. The chert cobble conglomerates of the alluvial fan facies and the coarse sands of the braided stream facies are the highest quality pay zones. Porosities range from 5 to 20%, with permeability ranging up to 26 d. The total unit is seldom more than 400 ft thick; reservoir rock thicknesses within the unit range up to 100 ft. Because of the complex nature of the alluvial fan and braided stream deposits, dry development wells can be expected within fields.

These Strawn deposits are located adjacent to and overlying the eroded lower Paleozoic uplifts of the southern Central Basin platform. The major source of the chert cobbles is erosion of the Devonian tripolitic chert. Renewed structural uplift combined with sea level drop in the middle Wolfcampian locally truncated some Pennsylvanian detrital alluvial fan deposits, and complicated or destroyed a potential trap by depositing Wolfcamp chert conglomerates on top of the Pennsylvanian conglomerates.

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