

Compartmentation in the Anadarko Basin: Implications for Exploration and Production: Abstract

Z. Al-Shaieb¹

ABSTRACT

Integrated pressure, potentiometric, and geologic data demonstrate the existence of a basin-wide, completely sealed overpressured compartment in the Anadarko basin. All reservoirs within this complex exhibit pressure gradients ranging from 0.6 to 0.98 psi/ft, which exceed the normal gradient of 0.465 psi/ft. These reservoirs have produced large quantities of natural gas, particularly from the Pennsylvanian Red Fork and Morrowan sandstones.

This mega compartment complex is enclosed by top, bottom, and lateral seals. The top seal, which is located between 8500 and 11,000 ft below the surface, is relatively horizontal, dips slightly to the southwest, and appears to cut across stratigraphy. However, the basal seal is stratigraphically controlled and seems to coincide with the Devonian Woodford Shale. The complex is laterally sealed to the south by an intense cementation zone associated with the Wichita uplift frontal fault zone and by the convergence of the top and basal seals along the eastern, northern, and western boundaries.

Nested within this complex is a myriad of smaller compartments with their own distinct pressure gradients. In addition, local overpressured compartments are present outside the mega compartment complex in normal and near-normal pressured regions.

Due to their hydraulically isolated nature, nested pressure compartments may provide drilling prospects that are not constrained by structural position or proximity to existing reservoirs. Predicting the compartment and seal geometries and internal reservoir quality should improve drilling success ratios and diminish hazards associated with drilling abnormally pressured rock sequences.

ACKNOWLEDGMENTS AND ASSOCIATED FOOTNOTES

1 105 Noble Research Center, School of Geology, Oklahoma State University, Stillwater, OK 74078

Copyright © 2006 by the Tulsa Geological Society