

Structural Geometry of Thrust Faulting in the Hartshorne Area of Frontal Ouachitas, Arkoma Basin, Oklahoma:

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This study is concerned with the structural geometry of the Pennsylvanian thrusting within the Hartshorne SW quadrangle of the Frontal Ouachitas - Arkoma Basin transition zone in southeastern Oklahoma. The study area includes the Hartshorne gas field where gas production ranges from five bcf in 17 months (middle Atoka from Agnes #1 well) to numerous dry holes.

Five balanced structural cross-sections are being constructed to determine the geometry of the Late Paleozoic thrust system. Data from the surface geological maps by the Oklahoma Geological Survey, wire-line well logs, scout tickets, and seismic profiles, donated by Amoco and Exxon Corporations are used to construct the cross-sections. Upon their completion, the cross-sections will be restored to determine the amount of shortening induced by thrusting in the area.

The Hartshorne, Fanshawe, Red Oak, Panola, Brazil, and Spiro sandstones are identified as marker beds to construct the cross-sections. We considered the Spiro to include the Wapanucka limestone. Our preliminary interpretation of the available data suggests that a triangle zone exists between the Carbon Fault to the northwest and the Choctaw Fault to the southeast. The footwall of the Choctaw fault zone contains a duplex structure and associated horses above the Woodford and Springer detachments with the Lower Atokan Detachment as the roof thrust. The Gale-Buckeye thrust system is present in the footwall to the south of the duplex structure. The Gale-Buckeye system may contain a back thrust in the study area.