The Potato Hills Gas Field, Latimer and Pushmatahn Counties, Oklahoma

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The Potato Hills have been the topic of debate since Miser, 1929, proposed that the surface structure exposes a fenster of older rocks viewed through a “window” in the low angle north-directed Potato Hills thrust fault (PIITF). Some recent workers observing small scale structures conclude that the Potato Hills result from either vertical uplift, stacking of thrust faults in a fan configuration or two periods of oppositely directed compression.

Shallow production at Potato Hills gas field was discovered by the Sinclair 1 Reneau in 1960, completed for 1.33 MMcfgd from Ordovician Bigfork Chert. However it wasn’t until the completion of the GHK et al #1-33 Ratcliff in September 1998 that a major gas accumulation was recognized. The Ratcliff well was completed for 35.77 MMcfgd from fractured Penn-Mississippian “Ratcliff Sandstone” (uppermost Jackfork Group sandstone). This paper presents new information developed during the GHK Corporation’s development of the Potato Hills Gas Field.

The new data, though not completely definitive, suggest that Misers’ interpretation is essentially correct although simplified. Observations have been made of 1) late Pennsylvanian folding of the PHTF and Windingstair thrust fault (WSTF) due to emplacement of an out-of-sequence fault carrying a large anticline on its hanging wall, 2) indications of a regional (?) unconformity near the top of the Jackfork, and 3) indications of early Mississippian tectonism, (i.e. a traveling normal fault affecting deformed Ordovician through Mississippian-aged rocks).

Because of ongoing exploration by GHK, this paper is restricted to depths about the Choctaw thrust fault; deep objectives in the Potato Hills are not discussed.