Western Alpine High Potential, West Flank Delaware Basin, Texas

Anthony Benson\textsuperscript{1} and Edward Benson\textsuperscript{2}

\textsuperscript{1}Amoco (Retired), P.O. Box 2848, Taos, NM, 87571, benson1@newmex.com
\textsuperscript{2}GOMEX Energy, Spring, TX

The Alpine High gas field discovery was announced by Apache in September, 2016, touting gas reserves of 75 TCF, mainly from the Mississippian Barnett and Devonian Woodford shales (Apache website, 2016) as posted by Benson (2017). Low gas prices and lack of pipeline infrastructure have delayed much development, but was scheduled to resume in the fall, 2022.

The authors are part of a team of energy specialists, put together for the JMB company, to evaluate their Hovey Ranches and surrounding areas to assess the total energy potential in Brewster and Jeff Davis Counties.

The original Apache acreage block of over 200,000 acres, mostly in western Reeves County appears to follow a paper published by Swift et al., (1994), whose outline showed potential conventional gas plays in Reeves County based on Woodford structure map and reprocessed 1970s vintage 2-D seismic data. The major up-to-the-west reverse fault No.1, lies just west of the Jeff Davis County line. A previous interpretation by Pearson (1985) mapped the Capitan Permian reef thick overlying the northwest trending Devonian shelf. A Permian thick was mapped in the subsurface by Standen et al., (2009, Figure 18).

An Ellenberger high was mapped under Alpine and trending northwest by Ammon (1981, Figure 11). Deep Ellenberger gas was found at Gomez field and other large fields in the 1960s causing the oil pipeline to be diverted back to California for natural gas consumption. The structural high is covered by the Star Mountain rhyolite (37 myo) portrayed regionally by McLeod (2009). A quarter mile wide by 200-foot-high ridge of Star Mountain rhyolite extends nearly 10 miles southeast from Little Star Mountain (probable vent) just west of fault No. 1, mapped at Woodford shale depth. It is interpreted that this dike extends at depth, following fault fractures and may have heated the Barnett and Woodford shales during the introduction of hydrocarbon expulsion. These areas should be avoided in future drilling.

Six wells have been drilled by Coterra, formerly Cabot Oil and Gas, and affiliates over the past four years, along this Star Mountain trend, including two 4000 foot horizontal laterals. They have been fraced in the Woodford, but no results are available. Coterra acreage leases have been dropped.

Northwest trending faults were mapped by King (1930) in the Glass Mountains. The Woodford produces oil in the Marathon fold belt (Reed and Strickler, 1990). Will high gas prices rejuvenate the unconventional plays on the west side of the Delaware Basin? Late timing of hydrocarbon generation may allow a vast area of unconventional hydrocarbon exploration.

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Alpine High, Delaware Basin, gas, hydrocarbon exploration

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