

Deep Stack Exploration of the Over-Pressured Meramec Shale in Blaine and Dewey Counties, OK

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ABSTRACT

The STACK play (Sooner Trend Anadarko Canadian Kingfisher) was discovered and named in 2011 by Newfield after the discovery and horizontal-staged frac development of Woodford Shale production in Cana Field and to the south in what Continental called the SCOOP play. The primary STACK pay is the Mississippian-age Meramec shale/siltstone. The Meramec was deposited in the northeastern Anadarko Basin just off the Mississippian carbonate shelf as cyclic prograding wedges of detrital siltstones, shales and carbonate sediments. These sediments were derived from the platform in an early low-stand or falling stage systems tract. The orientation of progradation is generally northwest to southeast with the proximal wedge sediments relatively low in clay and the distal toes are increasingly clay rich.

It was initially thought the Meramec shale was too tight to be productive; however, although low, $E_{fP} \sim 3\%$, $k < 3$ md, the poreperm architecture is consistent and pervasive, which means production is repeatable and ideal for a resource play. These sediments are saturated by maturation of the Woodford source rocks and migration below the Chester shales. Understanding Woodford maturity through vitrinite reflection and other geochemical methods is key in understanding Meramec pay. For example, the initial Meramec discoveries in Canadian and Kingfisher counties, Oklahoma were generally above a VRo of 1.0 or in what is called the “black oil zone”. Most operators decided the liquids in the Meramec would be wet to dry gas in Blaine County at a VRo of 1.1-1.2. In the past two years, several operators including Continental and Cimarex have pushed the envelope past the VRo of 1.1 into overpressured Meramec rock and have discovered wells in volatile oil to rich gas. Initial rates are as high as 2000+ BOPD (mostly condensate) and over 10 MMCFGPD. Thus, Blaine County is one of the richest parts of the Meramec STACK play.