

The Avalon Shale and Other Emerging Plays in the Northern Delaware Basin

Bill Hardie
OGX Resources

The Northern Delaware "Basin has for many years been exploited for conventional oil and gas reserves. Despite being a "mature" oil and gas province, there are still vast regions, particularly around the New Mexico-Texas border, that remain unexplored below the uppermost Bell Canyon sand ("Ramsey"). This lack of drilling recently began changing with the recognition that this part of the basin is a target-rich environment for unconventional plays. The most notable of these plays, the Avalon Shale, has seen over 180 horizontal wells drilled since 2009.

The Avalon Shale consists of the stratigraphic interval between the base of the Delaware Mountain Group and the top of the 1" Bone Spring Sand. It is approximately 900' to 1000' thick across southern Eddy and Lea Counties and into Texas. Like most unconventional shale plays, the Avalon is not a true shale, but rather consists of deep submarine organic-rich siltstones interbedded with detrital carbonates. In southern Eddy County, the Avalon is composed of about 2/3 siltstone and 1/3 carbonate. In southern Lea County, those ratios are reversed. As one moves north from the state-line area toward the Northwest Shelf, the overall section thickness increases and the organic siltstone content decreases. Here the interval is known as the 1" Bone Spring Carbonate.

In southern Eddy County, the Avalon often drills with mudlog shows and over the years this interval was occasionally completed vertically after deeper targets proved unsuccessful. Vertical Avalon completions are rarely commercial. In 2009, the first horizontal Avalon well, the PLU Pierce Canyon 17 #1H was drilled by Chesapeake with a first month average rate of 530 BOEPD. This well kicked off the current drilling activity and encouraged operators to test other unconventional targets in the area.

Two other similar plays in the Wolfcamp and the Basal Brushy Canyon are likewise beginning to emerge as commercially viable across the state-line area. The Wolfcamp is dominated by organic-rich siltstones, shales, and carbonate debris flows and in western Eddy County, like the Avalon, it is being exploited horizontally. Elsewhere in the state-line area, unconventional Wolfcamp completions are being attempted in vertical wells with promising results. Horizontal drilling in the basal Brushy Canyon began as a means of extending conventional reservoir development into areas where drilling was prohibited by potash mining. This activity has since expanded into areas where the basal Brushy Canyon becomes "shaley" and has insufficient porosity and permeability to produce in vertical wellbores.

This talk will examine the rock properties, stratigraphic distribution, production characteristics, and evolving completion practices of these three emerging plays. Comparisons to other popular shale plays will also be made. Unconventional development in the Northern Delaware basin will undoubtedly result in conventional discoveries in the Delaware Mountain Group and Bone Spring Formation. The future looks bright for Delaware Basin oil and gas development and our quest to meet this country's energy demands.