

ABSTRAC1

West Virginia, known historically as a coal producing state, has recently experienced a dramatic increase in natural gas production from the Marcellus Shale. The southern and western extent of the Marcellus Shale fairway generally lies within West Virginia, and in a short period of time, Marcellus drilling activity has transformed the economic landscape and outlook of natural resources in West Virginia. Since 2005, over 2100 Marcellus wells penetrated and produced from the Marcellus Shale before 2005. but use of the technical combination of horizontal drilling and hydraulic fracturing of wells created a rapid escalation of shale gas drilling in the Appalachian basin. Approximately 650 of those wells are horizontal while approximately 1500 are vertical, though the current trend is dominated by horizontal wells. Total reported gas production in West Virginia has increased from approximately 0.8 Tcf in 2005 to over 3 Tcf in 2012. Though some of these well have commingled production from other producing zones, the vast majority is Marcellus Shale-derived das. as well as the heavier-chain hydrocarbons known as natural gas liquids or "wet gas". Multiple-stage completions in excess of 40 stages and measured depths of over 15,000 ft are observed. The lateral legs are often drilled perpendicular to naturally occurring structures to capitalize on the natural stress orientation. As the Marcellus play has shifted from being exploratory to developmental, regional and localized "sweet spots" have been identified. Production of natural gas liquids, including ethane, pentane, and butane h increased steadily from 2005 to 2012. While the present focus is predominantly on liquids-rich areas, an increase in the price of natural gas would again lead to an expanded geographical interest of the dry gas regions of the Marcellus Shale in West Virginia. Regardless, projections for future production continue to increase. The West Virginia Geological and Economic Survey(WVGES) continuously updates a database for all oil and gas activity in West Virginia while conducting geological research Current research includes the examination of the geological controls on the Marcellus Shale as well as a volumetric resource assessment of Marcellus potential in the State.

MARCELLUS IN OUTCROP AND CORE



Generalized stratigraphic chart for West Virginia showing stratigraphic position of Middle Devonian Marcellus Shale.



geographic reconstruction of Middle (385 MA) at time of Marcellus deposition (modified from Blakey, 2011









Detailed map of several horizontal wells showing horizontal leg and geometry of multiple laterals off of same well pad.



FRACTURE NETWORK

dicular to the natural fractures.

The Shifting Landscape of Marcellus Shale Development in West Virginia Philip A Dinterman, Susan E. Pool, Jessica Pierson Moore, J. Eric Lewis, Jennifer L. Luczko

of Middle Devonian Marcellus Shale in the Appalachian Basin, Northeastern U.S.A. Doctoral dissertation, Morgantown, WV: West Virginia University.