

Marcellus Shale Subsurface Stratigraphy and Thickness Trends: Eastern New York to Northeastern West Virginia

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Recent interest in the Middle Devonian Marcellus Shale of the Appalachian Basin necessitates a more complete understanding of the subsurface stratigraphy of this emerging play. Tracing of the stratigraphy of the Marcellus Shale defined by outcrop studies in New York, which comprises two black shale intervals separated by a thin limestone horizon, yields information regarding basin evolution, notably differential uplift likely produced by development of a forebulge during the Acadian Orogeny. However, difficulty in identifying the Stafford Limestone at the top of the Marcellus over much of the subsurface of central and northeastern Pennsylvania and eastern-central New York precludes widespread use of this stratigraphy. Perhaps more meaningful to explorationist is the total radioactive interval thickness of the Marcellus Shale. In most regions of the basin, the Marcellus comprises lower and upper radioactive intervals separated by a limestone or shaley-limestone interval of variable thickness. The total radioactive interval thickness of the Marcellus Shale increases to > 200 ft toward the center of the basin in the Lycoming County area of Pennsylvania. Mapping reveals a thick (locally > 200 ft) north-northeast-trending area of thick radioactive shale extending through western Susquehanna County, Pennsylvania, into Broome and Chenango counties, New York. Isopach trends in the Fayette County, Pennsylvania, region of the of basin may reflect the influence of the Rome Trough, but not to the extent that depositional patterns of the Upper Devonian Rhinestreet and Huron organic-rich shale intervals were affected by subsidence of the trough.