Lithostratigraphy of Middle and Upper Devonian Organic-Rich Shales in West Virginia

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ABSTRACT

Middle and Upper Devonian organic-rich shale formations in West Virginia include significant oil and gas source rocks and reservoirs. Formal lithostratigraphy for these units is well established in the southern and eastern portions of the state, but is typically less well-defined in the northern and central areas where the units occur deep in the subsurface and where resource development is currently concentrated. Historically, subsurface lithostratigraphic terminology has been assigned by reference to units defined in outcrops along the basin margins and extended into the state through correlation of well log information. However, terminology emanating from the more distal northern (western New York) and western (Ohio and Kentucky) basin margins is not always readily reconciled with terminology established in more proximal outcrops along the Allegheny Front and extended westward. As a result, the geographic distribution and lithostratigraphic nomenclature for many of these units remains unsettled in the basin center. In this study, correlation of log data from approximately 400 wells throughout West Virginia enables detailed mapping of Middle and Upper Devonian organic-rich facies, allowing the determination of vertical and lateral lithostratigraphic unit boundaries throughout the West Virginia subsurface. Recommendations for nomenclature are based on precedence and utility. Units described and mapped include: 1) the Middle Devonian Hamilton Group and its constituent Mahantango and Marcellus formations; 2) the Tully Limestone; 3) the Burket Shale Member of the Harrell Shale and its lateral equivalent Geneseo Member of the Genesee Formation; and 4) the extent of the Upper Devonian Genesee, Sonyea, West Falls, and Java formations (as well as the lower part of the Huron Member of the Ohio Shale) and the position of their lateral eastward boundary with the age-equivalent Brallier Formation.