

## **Geochemical Risk Assessment of the Marcellus Shale - A Case Study of the House Unit # 1, Clearfield County, Pennsylvania**

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The Appalachian Basin is the largest onshore basin in the United States and is now experiencing a major resurgence in exploration as an unconventional shale gas play. Geochemical techniques that have been previously used to successfully understand the prolific Barnett Shale in the Fort Worth Basin are now applied to the Marcellus Shale.

Thermogenic shale gas systems can be segregated into various types depending upon geochemistry and geology. Both the Barnett and Marcellus Shales are considered to be high thermal maturity systems. However, differences in source rock potential and maturity can play key roles in the generation, retention, storage and potential destruction of hydrocarbons. In this case study, a geochemical risk assessment has been conducted to evaluate the Marcellus Shale interval in the Houser Unit #1 well located in Clearfield County, Pennsylvania. Cuttings from this well were analyzed by a variety of geochemical techniques, including total organic carbon, programmed pyrolysis and organic petrology with measured vitrinite reflectance (Ro). This source interval is interpreted to represent a low to moderate geochemical risk for thermogenic shale gas production. TOC in the basal Marcellus Shale averages 2.85%, which exceeds the recommended minimum of 2%. Measured vitrinite reflectance of 2.64% Ro indicates thermal maturity in the dry gas window and is sufficient for significant secondary gas generation. Average estimated cracked gas generation potential for the 100' thick basal Marcellus Shale interval in the Houser Unit #1 well is 2500 mcf/a-ft, as compared to 3200 mcf/a-ft for the zone of productive Barnett Shale.