

An Organic Geochemistry Database - Evaluating the Marcellus Shale and Other Potential Petroleum Source Rock in Pennsylvania

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Organic geochemistry is a key factor in evaluating and mapping petroleum source rocks and unconventional thermogenic shale-gas reservoirs, including the Marcellus Shale in Pennsylvania. The recent flurry of Marcellus activity has prompted the Pennsylvania Geological Survey to compile and release an extensive database of previously unpublished geochemical source rock data. The analyses represent samples from 28 wells and a few outcrops in 21 different counties throughout Pennsylvania. Most of these wells are situated on the Appalachian Plateau, however, six are located in the Ridge and Valley province, and one well is in the Triassic rocks of the Newark basin in southeastern Pennsylvania. The 10 outcrop samples are from the Newark basin. The following analyses are presented in the database: (1) Total Organic Carbon (TOC); (2) Rock-Eval pyrolysis; and (3) visual kerogen, including vitrinite reflectance (R_o), thermal alteration index (TAI), kerogen type, and fluorescence. The data indicate the source rock potential, the product expelled at peak majority, and the stage of thermal maturity. In addition to these data, we will be adding comprehensive stable gas isotope analyses to the database. Specific results from the Marcellus Shale interval provide an example of how geoscientists can utilize the raw data sets to evaluate the source rock and shale reservoir potential of this unit. Geochemical logs for selected wells provide a comprehensive look at how potential source rock intervals throughout the commonwealth are identified and evaluated. The data will provide a useful tool for geologists working with the Marcellus shale, and for identifying other potential black shale reservoirs in the state.