

SYMPOSIUM ON GEOCHEMISTRY AND CHEMISTRY OF OIL SHALE  
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GEOLOGY OF THE DEVONIAN BLACK SHALES  
OF THE APPALACHIAN BASIN

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ABSTRACT

Black shales of Devonian age in the Appalachian basin are a unique rock sequence. The high content of organic matter, which imparts the characteristic lithology, has for years attracted considerable interest in the shales as a possible source of energy. Concurrent with periodic and varied economic exploitations of the black shales are geologic studies. The recent energy shortage prompted the U. S. Department of Energy through the Eastern Gas Shales Project of the Morgantown Energy Technology Center to underwrite a research program to determine the geologic, geochemical, and structural characteristics of the Devonian black shales in order to enhance the recovery of gas from the shales. Geologic studies produced a regional stratigraphic network that correlates the 15-foot sequence in Tennessee with 3,000 feet of interbedded black and gray shales in central New York. The classic Devonian black-shale sequence in New York has been correlated with the Ohio Shale of Ohio and Kentucky and the Chattanooga Shale of Tennessee and southwestern Virginia. Biostratigraphic and lithostratigraphic markers in conjunction with gamma-ray logs facilitated long range correlations within the Appalachian basin and provided a basis for correlations with the black shales of the Illinois and Michigan basins. Areal distribution of selected shale units along with paleocurrent studies, clay mineralogy, and geochemistry suggests variations in the sediment source and transport directions. Current structures, faunal evidence, lithologic variations, and geochemical studies provide evidence to support interpretation of depositional environments. In addition, organic geochemical data combined with stratigraphic and structural characteristics of the shale within the basin allow an evaluation of the resource potential of natural gas in the Devonian shale sequence.