Gas Potential of Ouachita Facies, Atoka and Pushmataha Counties, Oklahoma

Atoka and Pushmataha Counties lie along the westernmost exposure of the Ouachita facies in southeast Oklahoma. Eight gas wells have been completed in this isolated exploration area, and six exploratory tests are in the drilling or completion stage. Seven of the completed wells are productive from the Mississippian Stanley sands, and produce at low daily rates. In mid-summer of 1980, a gas well was completed from the Arkansas Novaculite of Early Mississippian–Devonian–Silurian age, and from the Bigfork Chert of Ordovician age. Although a production history is not available on this well, an extensive lease play has resulted, and increased exploratory drilling has begun. The Novaculite–Bigfork production appears to be primarily fracture controlled, but will deliver gas at commercial rates. Only five tests in this general area were ever drilled deep enough to penetrate the Novaculite and/or Bigfork in the past, with three reporting commercial flows of gas, but owing to being in an isolated area with no gas pipeline, exploration has been at a lull since the late 1950s. With the new drilling technology known today, the greatly improved stimulation methods, and adequate gas market conditions, this area will provide new exploratory targets in the 1980s.

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Coal Geology of Northern Part of Northeast Oklahoma Shelf Area

Nine commercially important coal beds are present in the northern part of the shelf area of northeastern Oklahoma. Included in the area are parts of Craig, Mayes, Nowata, and Rogers Counties. The coal beds are of Desmoinesian (Middle Pennsylvanian) age. From oldest (lowest) to youngest (highest) they are: Rowe coal, Drywood coal, Bluejacket coal, Weir-Pittsburg coal, Mineral coal, Fleming coal, Croweburg coal, Iron Post coal, and Dawson coal.

Tonnages of resources and reserves were estimated for coal beds 10 in. (25 cm) or more in thickness for depths to 100 ft (30 m), and for coal beds 14 in. (35 cm) or more in thickness for depths greater than 100 ft (30 m). Methods used to calculate figures were adaptations of standard methods used by the U.S. Bureau of Mines and the U.S. Geological Survey. Remaining resources of coal for the four-county area total 1,063,466,000 short tons, of which 110,584,000 short tons are in the reserves category. In the entire four-county area the coal bed with the most remaining resources and reserves is the Weir-Pittsburg, with 490,869,000 short tons, and 31,055,000 short tons, respectively.

Coals of the area are predominantly of high volatile A-bituminous (hvAb) rank. Coal from the Croweburg bed has the highest overall quality and has an average sulfur content of less than 1%. Other coals in the study area have sulfur percentages averaging above 3.5%.

All coal produced in the four-county area during the time of the study was mined by surface methods. Production of coal peaked in the late 1970s, with 3,666,645 short tons reported mined in 1977, and 3,462,816 short tons reported mined in 1978. Rising production costs, a depressed market, and environmental restrictions have contributed to a decline in production in recent years.

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Anadarko Basin—A Model for Regional Petroleum Accumulations

Many basins being explored today can be viewed as regional petroleum accumulations. The Anadarko basin is used to describe how its depositional and orogenic history, its patterns of deposition and subsequent patterns of hydrocarbon accumulation, and its basic geochemical aspects all combine to make this basin a unique regional petroleum accumulation. The explorationist must view each basin as a unique entity and fully understand its regional characteristics to efficiently compete for the petroleum reserves therein.

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High-Constructive, Tidally Influenced Deltaic Sedimentation in Arkoma Basin: Desmoinesian Hartshorne Sandstone

The Hartshorne Sandstone and associated fine-grained facies of the Arkoma basin were deposited in a high-constructive, tidally influenced delta system which prograded longitudinally from east to west in an elongate, foreland basin during Ouachita suturing.

Prodelta facies (generally mapped as upper Atoka) consists of dark gray, nonfossiliferous shales. Delta front facies deposited near the mouth of an active distributary channel include interlaminated siltstones and sandstones of distal bar origin and ripple-bedded and trough cross-bedded sandstones of distributary-mouth bar origin. Delta front facies deposited in interdistributary areas consists of lenticular, wavy, and flaser-bedded sandstones, siltstones, and shales deposited under the influence of tidal currents. Delta plain facies is sandstone, siltstone, shale, and coal deposited in distributary channels, interdistributary bays, crevasse splays, marshes, and swamps. Distributary channel sandstone bodies display shoestring geometry (50 to 60 m thick), 1 to 3 km wide, tens of km long) and internally are unidirectionally trough cross-bedded. Their linear geometry and thickness relative to other delta facies suggest that channels were structurally localized, that the delta was elongate, or a combination of the two. Interdistributary bay facies comprise locally fossiliferous shale and silty shale. Crevasse splay facies coarsen upward from shale through ripple-bedded sandstone to trough cross-bedded sandstone. Marsh and swamp facies are carbonaceous shale and coal.

In Arkansas, the Hartshorne displays a single, progradational sequence of prodelta, delta front, and delta plain facies. In Oklahoma, the prodelta and delta front facies are capped by a complex assemblage of delta plain facies which records at least three episodes of active sedimentation followed by delta plain abandonment. Understanding the genesis of these delta plain facies will enhance petroleum and coal exploitation efforts within the Hartshorne of the Arkoma basin.

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Methane Production Potential from Hartshorne Coal Beds in Deep Parts of Pittsburg, Coal, and Hughes Counties, Oklahoma

Bureau of Mines investigations show the Hartshorne coal beds of the Arkoma basin are among the most gassy in the United States. The Hartshorne coal beds in Haskell and