tive trend to develop has been along the north flank of the Marietta basin in southern Oklahoma. There has been great interest in the Viola on both sides of the Arbuckle Mountains, and in a new discovery along the complex mountain front province of the Anadarko basin. In addition, there are numerous OWWO attempts along the southern end of the Central Oklahoma platform

Few wells in the Viola have the capability to produce without large frac treatments, and some require some special treatments for paraffin and other impurities. To date, no H_2S has been encountered. The future of Viola development across large parts of Oklahoma is excellent with some very promising trends still untested.

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Comments on Structure Within Wichita Mountains Crustal Block

Work in preparation for a new map of the Wichita Mountains has led to revisions of the surface structure within the exposed igneous rocks. As the presumed faulting pattern will have bearing on the development of regional tectonic models, it is important to document clearly whether major structural discontinuities exist inside this crustal block. Fault distributions within the main igneous outcrops in the eastern Wichitas have been shown on the Oklahoma state geologic map and carried forward in *Oklahoma Geol. Survey Hydrologic Atlas* 6. These faults can be grouped into two categories based on stratigraphy: those separating rocks of the *same* stratigraphic unit, and those separating rocks of *different* stratigraphic units. Field work over the period of 1977 to the present now shows that all those previously accepted faults which allow contact of different igneous lithologies are actually *intrusive* contacts. Accordingly, such faults do not exist. No unequivocal major faults (i.e., separations of tens to hundreds of meters) have been identified in the igneous rocks although prominent lineaments do exist.

The work described above plus new published stratigraphic information on the igneous sequence leads to several speculative ideas on regional deformation associated with the Wichita arch. These ideas follow somewhat the reasoning advanced by Ham, Denison, and Merritt, but with modifications as required by new data.

(a) The integrity of the main Wichita Mountains horst block results from its underlying gabbroic substrate (Raggedy Mountain gabbro group) rather than the covering, thin Wichita granites, or Carlton rhyolite.

(b) Intrusion of the Roosevelt gabbros as small plutons into the Glen Mountains layered complex marks the beginning of the Wichita Mountains block as a structural unit. This timing is not yet well-dated but is clearly pre-rhyolite and pre-granite in age.

(c) Few faults will be found in areas underlain by much gabbro. For example, faults bounding the south side of the Anadarko basin may indicate the most northerly extent of gabbro. Basement beneath the Anadarko basin should have little gabbro.

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Lignite Development and Utilization in Mid-Continent Region

Until recently, the Mid-Continent region, with large supplies of oil and gas, had little incentive to exploit lignite, a low-grade coal of Tertiary age. Increasing prices for natural gas and the Powerplant and Industrial Fuel Use Act changed this situation in the 1970s and today we find major utility use of lignite as a boiler fuel in Texas, development beginning in Louisiana, and considerable interest by utilities in Arkansas. The greatest lignite reserve base in the Mid-Continent area is in Texas with 8.6 to 11.1 billion short tons of near-surface lignite reserves, followed by Arkansas with 2.5 billion and Louisiana with 1.1 billion tons.

The first use of lignite in the modern era of lignite development occurred in Texas in 1954 near Rockdale where it was developed as a boiler fuel for electricity generation in connection with aluminum refining operations. In 1971, Texas Utilities opened a major lignite-fired generating station near Fairfield, Texas, followed by two other large mines and generating stations in east Texas by the same company and announcements of additional mines by Texas Utilities and others. Development of lignite will begin in Louisiana in 1981. Five mines are planned in northwest Louisiana for the mid-1980s with Phillips Coal Co. the largest lignite reserve holder in the Gulf Coast area, responsible for the two largest mines. Three of the mines will be developed for electricity generation, two will be for industrial use of lignite. Firm commitments to lignite use in Arkansas are pending with Arkansas Power and Light Co. the closest to opting for lignite use. All current operations and announced developments rely on surface mining techniques; most are classic drag-line area-stripping operations.

Many large blocks of near-surface lignite reserves in Texas and Louisiana have been committed to use for power generation. Use for gasification is under consideration by Exxon at a large deposit near Troup, Texas. Pilot in-situ gasification projects have been conducted in Texas to develop methods for extracting lignite too deep to mine.

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Middle Atokan Delta Systems in Arkoma Basin of Arkansas

The Arkoma basin, located in southeast Oklahoma and west-central Arkansas, is a Pennsylvanian basin which produces gas exclusively, primarily from stratigraphic traps in Atokan and Morrowan sandstones. Many analogies can be made with the Gulf Coast basin; low-angle normal faults, growth faults (both large and small), and abundant sand deposition in a shallow-marine environment.

A series of large growth faults separates the shelf from the deep basin. These faults were active during middle Atokan, adding thick additional section to the deep basin. No correlation exists at this time between the shelf and deep basin sandstones in the middle Atokan.

Throughout the Morrowan and Atokan, a series of delta systems developed across the northern shelf of the basin, mainly from the middle Atokan; the Alma, Carpenter 'B,' Morris, Tackett, and Areci sandstones. Although variable in lateral extent, thickness, and location all have a northeast source and a broad lateral distribution along the shelf. Post-Pennsylvanian erosion has removed the upper distributary part of the above delta systems.

All middle Atokan sandstones produce gas from stratigraphic traps within distributary mouth bars, barrier bars, and delta front sands. All are complicated by normal faults.

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