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**Middle and Lower Ordovician Carbonates in Central Kentucky—A Comparison of Porosity and Permeability Between an Uplifted and Faulted Surface Exposure and Cores from a Fractured Reservoir Along a Fault**

The Middle and Lower Ordovician predominantly carbonate sediments, are composed mainly of dolostone and limestone. These formations are of important economic significance because of their composition and association with hydrocarbon and mineral deposits. Depositional features suggest regressive carbonate cycles deposited on tidal flats within the intertidal, supratidal, and shallow marine environments. An unconformity of regional extent developed between the two periods.

Structurally, the area lies on the axis of the Cincinnati Arch, a major structural feature that separates the Appalachian Basin to the east from the Illinois Basin to the west. Structural features associated with the Arch are the Jessamine Dome to the north and the Nashville Dome to the south. A structurally low feature, the Cumberland Saddle, separates the two domes. The entire area is underlain by basement structures which were reactivated during various periods in geologic time. Numerous fault systems also exist, some complex and others vary from no surface expression to displacement in excess of 500 feet.

Hydrocarbons migrated from deep in the Appalachian and Illinois Basins both vertically and horizontally, through faults, fractures, joints, weakened bedding planes, vugs, breccias, unconformable surfaces and along the flanks of the arch to accumulate in Ordovician reservoirs. The porosity characteristics of these carbonates are secondary due to chemical and physical changes such as dolomitization, solution channels or fractures. The porosity and permeability and pore space distribution observed at the outcrop and in core samples are related to the depositional environment, changes that have taken place after deposition, and tectonic activity.