

Silurian Carbonate Reservoirs of the Mount Auburn Trend along the Sangamon Arch, West-Central Illinois

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The Silurian succession of the Sangamon Arch in west-central Illinois is composed of hydrocarbon-bearing carbonate rocks. Over 12 million barrels of oil have been produced from these rocks in the Mount Auburn trend, along the southern flank of the arch, chiefly from dolomitized carbonate reservoirs in the upper part of the Niagaran series. To date, there has been no detailed study of the Niagaran reservoirs in the Sangamon Arch area; there is a general lack of understanding of the reservoir facies types, distribution, geometry, porosity development, petroleum entrapment and their controls. Detailed subsurface studies along the Mount Auburn trend have revealed the presence of permeability pinch outs at several horizons. They include dolomitized packstone-grainstone facies in the upper part and coral patch reefs in the lower part of the Niagaran succession. These reservoir facies are characterized by lenticular bodies of limited lateral extent that grade laterally and vertically into an impermeable limestone facies or a very finely crystalline, argillaceous dolomite facies. They were deposited along a southwest trending platform margin that was roughly parallel to the Sangamon Arch trend and graded basin ward into muddy carbonates below wave base. This study shows that reservoir rocks in the study area are compartmentalized and productive facies display a shallowingupward cycle that may occur at several horizons. However, most wells drilled thus far have only tested the uppermost part of the Niagaran succession; only a few wells have tested the lower reservoirs that include the newly-recognized patch reefs. A detailed subsurface facies analysis is currently underway to characterize the distribution of various porosity zones and assess the potential for finding additional productive pay zones in the Sangamon Arch area.