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### **Fluvial Deltaic Deposition in a Cratonic Basin**

The Mississippian Chesterian Age Benoist (Yankeetown) Sandstone produces oil from numerous structural and stratigraphic traps in the Illinois Basin. Utilizing 1800 wireline logs an isopach map of the Benoist was prepared for an area of approximately 7000 square miles in south-central Illinois. Eight different individual Benoist reservoirs were studied for their trapping mechanism and heterogeneity.

The Benoist sandstone was deposited as part of a fluvially dominated deltaic system in a cratonic basin. Regional mapping of the Benoist sandstone isolith shows two distinct linear orientations. The northwest trending sandstone bodies were deposited as distributary mouth bar-channel sandstones that form reservoirs with numerous reservoir compartments. The northeast oriented sandstone bodies appear to have been deposited as a series of shoreline strandline systems that formed by coastal processes. The reservoirs within these strandlines can form stratigraphic traps caused by an updip-pinchout of the reservoir sandstone.

Regional mapping of the Benoist depositional systems helps differentiate the play into areas with high and low degrees of reservoir compartmentalization. For development purposes, areas with complex reservoir compartmentalization may have potential infill drilling opportunities because of by-passed oil. The regional mapping also provides a clue on whether an exploration prospect would have a strong structural or stratigraphic component to the trap.