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**PS** **Mississippian Lithostratigraphic Architecture and Internal Depositional Systems Variation Along the Shelf-Break in Southern Kansas and Northern Oklahoma\***

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### **Abstract**

Recent studies of the tri-state (MO-AR-OK), Mississippian outcrop belt, have yielded a comprehensive model of platform architectural evolution and component depositional systems genesis, in Kinderhookian thru basal Meramecian strata and thus, serves as a as a template for the subsurface Mississippian, in southern Kansas and northern Oklahoma. Subsurface log correlations, coupled with 3-D seismic impedance models and cuttings/core analysis show the overall lithostratigraphic architectural motif of Kinderhookian-basal Meramecian strata is consistent along the shelf-break, from the outcrop belt westward into the subsurface, to the Oklahoma panhandle. The subsurface Kinderhookian to basal Osagean strata is correlative to the outcrop, where the rocks are predominantly non-cherty carbonates and shales that were deposited on a shallow aggradational ramp. Platform evolution drastically changed during ensuing Osagean, and basal Meramecian time, where depositional geometries became strongly progradational in nature and at least three southward trending wedges are recognized. Depositional facies within the oldest Osage wedge, like on outcrop, are composed of very siliceous carbonates and tripolite. The next two progradational sequences are composed of carbonate-free spiculite/shale and a hybrid spiculite/shale-cherty carbonate, respectively. Although not directly correlative to coeval deposits to the east, these systems share the same progradational framework and relative, shallow-to-deep, facies distributions. Distinguishing and delineating individual and discrete reservoir objectives within the aforementioned systems can be tough as their distributions are complex, and in many places overprinted by syndepositional tectonics and erosion however, with inherent knowledge of the lithostratigraphic architecture, correlations are readily identifiable in log cross-section and on seismic impedance lines.