

## **Stratigraphy, Timing and Rock Properties of Lower Skinner Valley Fill Sandstones**

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High-resolution stratigraphy based on core and wireline logs was used to establish the timing of deposition and boundaries of the Pennsylvanian Lower Skinner valley fill sandstone. This sandstone produces large volumes of oil and gas from traps that combine two key components: porous reservoir and anticlinal folding. Lower Skinner valleys formed in response to a drop in sea level that exposed much of the NE Oklahoma Platform to erosion by streams that incised underlying strata. The resulting valleys, which form narrow, linear trends, filled with sediment during this lowstand or the subsequent transgression.

Lower Skinner valleys that eroded through underlying "Skinner" highstand deltaic and marginal marine strata resulted in the juxtaposition of fluvial Lower Skinner sandstone on the partially eroded Pink Limestone marker. In some cases, incision removed the Pink Limestone, and Skinner valley fill sediments were deposited directly on Red Fork strata. When valley fill sandstone directly overlies the Red Fork Sandstone, identifying the contact with confidence is difficult. Core derived data, including sedimentary structures were used to determine the position of the Skinner - Red Fork contact, whereas detailed correlation between wells outside the valleys was used to determine the "Skinner" interval removed by erosion, the relative timing of incision, and its stratigraphic position.

Porosity in valley fill sandstones is mostly secondary. Three distinct pore sizes (micro, small and large) were identified. Microporosity is intragranular or associated with pore-filling authigenic clay. Small- and large-sized pores reflect partial to complete dissolution of detrital feldspar grains and metamorphic rock fragments.