

STRATIGRAPHY, DEPOSITIONAL ENVIRONMENT, AND RESERVOIR CHARACTERIZATION OF THE LAYTON AND OSAGE-LAYTON SANDSTONES OF NORTH-CENTRAL OKLAHOMA

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ABSTRACT

The Pennsylvanian Layton and Osage Layton sandstones are important oil- and gas-producing reservoirs in northern Oklahoma. However, these reservoirs are not well understood, and have not been evaluated using modern stratigraphic concepts. The main goal of this study is to develop a better understanding of the geology of the Layton and Osage-Layton sandstones and relate it to reservoir quality and well performance.

This study will use wireline well logs to identify stratigraphic surfaces such as radioactive shales to identify sequence packages. A sequence stratigraphic framework will be constructed to define the regional depositional setting. Porosity and permeability measurements from core plugs will be compared to wireline log porosity values to calibrate logs for mapping reservoir quality.

Isopach and isolith maps will be constructed to determine distribution and thickness of the individual sandstones at the field scale, and accommodation and direction of sediment transport at the regional scale. Cores of the Layton and Osage-Layton formations will be examined, described, and sampled for additional analyses including thin-section petrography and x-ray diffraction analysis. These analyses will provide grain size, composition including detrital and authigenic minerals, and types and frequency of pores.

Once all data has been collected and analyzed, it will be integrated into a complete reservoir study that examines how each parameter affects reservoir quality and well performance. This better understanding of these reservoirs will give the petroleum industry a more complete reservoir model and enhance exploration and development of these or similar Pennsylvanian sandstones.