

Thomson and Stancliffe, 1990

Data Set 66

Reference: Thomson, A., and R.J. Stancliffe, 1990, Diagenetic controls on reservoir quality, eolian Norphlet Formation, South State Line Field, Mississippi: in Sandstone Petroleum Reservoirs, J.H. Barwis, J.G. McPherson, and J.R.J. Studlick, eds, Springer-Verlag, p. 205-224.

Authors' affiliation: University of New Orleans and Shell Offshore Inc.

Age: Late Jurassic (Oxfordian)

Formation: Norphlet Formation

Location: South State Line Field, Mississippi Interior Salt Basin, Greene County, southeastern Mississippi, United States

Well: Shell Lucas No. 1

Depth range: 17,970 - 18,300 feet subsurface

Lithology: Dune and interdune deposits. Lithic feldsarenite, composed of very fine to medium-grained sand, consisting of nearly 50% framework quartz. Bulk samples of sandstones from both dune and interdune facies are moderately to well-sorted, although individual laminae in dune facies sandstones may be very well sorted.

Alteration: "In terms of reservoir quality, the most important authigenic minerals are illite and chlorite. Illite occurs as standalone or pore-bridging fibers in the upper several hundred feet of the Norphlet. Because of its high surface area and pore throat-clogging nature, illite has a detrimental effect on reservoir quality. It often completely blocks pore spaces and may severely reduce porosity and permeability. Chlorite occurs in amounts visible under the microscope only in the lower Norphlet sandstones, as coating on detrital grains. The coating consists of 5-10 micron wide pseudo-hexagonal plates, aligned perpendicular to grain surfaces. Significantly, the chlorite coatings are the thickness of one crystal only and do not totally occlude pore space. The presence of illite in upper Norphlet sandstones has been accompanied by significant compaction-related porosity loss as a result of pressure solution. Sutured contacts and tight packing of grains are common. Thin, closely spaced stylolite seams occur in zones rich in pyrite. Chlorite on the other hand, has the reverse effect. Lower Norphlet sandstones with chlorite coatings on grains display less evidence of pressure solution: grain contacts are not sutured and packing of grains is looser than in upper Norphlet sandstones."

Production: gas and condensate

Core measurement conditions: Permeability to air measured on unstressed plugs.

Data entry: hand entry from Figure 9-15 of the reference.