

JAMES LIMESTONE IN WINN AND NATCHITOCHE PARISHES, LOUISIANA

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ABSTRACT

The James Formation of Lower Cretaceous age ranges from 400 to 550 feet thick within the Winnfield trough of Winn and Natchitoches Parishes, Louisiana. It is overlain by the Bexar Shale and underlain by the Pine Island Formation and it can be subdivided into lower and upper units of approximately equal thickness.

The lower James consists of gray micritic limestone and interbedded gray shale in the area of study and does not appear to have any reservoir characteristics.

The upper James is of potential economic value because it contains porous zones within an arcuate trend in Winn and Natchitoches Parishes. This trend has a reefal appearance on electric logs but a study of drill cuttings and cores (which were available for only a few wells) reveals no definite reef-like characteristics. Instead, the upper James within this trend consists primarily of skeletal-clastic limestone. Only a few thin zones containing whole, small caprinids give any hint of reef-like character. The cores also show that the upper James is a bedded rather than a massive limestone, even though the leftward excursion of the SP curve gives the zone a massive appearance.

The upper James skeletal-clastic limestone is 330 feet thick in one test well and between 200 and 300 feet thick in four other test wells. Based on grain size, most of the upper James in this trend is calcarenite but some zones are entirely calcilutite. The principal limestone varieties are light-colored fossiliferous intramicrite, fossiliferous pelmicrite, fossiliferous intrasparite, and micrite. The principal types of fossils present are broken shell fragments, miliolids, occasional *Orbitolina texana*, several unidentified forams, occasional small gastropods, occasional small caprinids, and questionable algae. It is surmised that most of the shell fragments are broken caprinids or other types of rudists. In general, the intraclasts are well-rounded and they are composed of micrite which contains forams (principally miliolids), fine shell fragments and pellets. There were no oolites seen in any of the cores examined.

Isopach data indicate that the upper James skeletal-clastic limestone was deposited in low areas adjoining only slightly higher areas. The western pod of porous limestone is in a definite isopach thick and the eastern pod is on the flank of a structurally positive area. The presence of caprinids may be an indication that rudist patch reefs or rudist banks are present within this trend.

To the southwest, south and east, the upper James consists principally of interbedded gray argillaceous micrite and gray shale, and to the north and northwest it consists of some combination of interbedded gray micrite, oomicrite, oosparite, fossiliferous limestone, quartz sandstone and gray shale.

The few test wells that have cored the upper James skeletal-clastic limestone indicate that porosity is generally less than 10 per cent, with a range of approximately 4 to 16 per cent. The net thickness of porous limestone is generally less than 30 feet in this trend. Calcite-lined vugs and intergranular calcite-lined openings are the main types of porosity in the rock, and porosity may be present in both the micritic and sparry rocks. Permeability is generally low, commonly being less than 0.1 Md. but reaching as high as 50 Md. in small intervals.

A number of significant gas shows have been reported from test wells in the upper James skeletal-clastic limestone trend. Several combination stratigraphic-structural anomalies are present in the area, making the James a valid target for additional wildcat drilling.

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