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Ordovician Viola Limestone, Southeast Joiner City Field, Oklahoma

The Viola Limestone has become one of the major exploration objectives in southern Oklahoma. Several fields have been discovered along the northern flank of the Marietta basin in the past five years, and Viola exploration continues to expand along this trend.

Southeast Joiner City field in Carter and Love Counties, Oklahoma, has been an area of recent Viola activity. Structurally, it is a NW-SE trending anticline, bounded on the southwest by a small reverse fault, and on the northeast by the southern limb of the Rock Creek nose.

In July 1979, Chevron USA deepened the J. S. Bates et al 1 to the Viola and completed the well for an IP of 654 BOPD. A total of 11 Viola wells have since been completed in Southeast Joiner City field by Chevron, and one additional well by Petro-Lewis. Total field production from the Viola as of November 9, 1980, was 266,039 bbl.

The Viola Limestone in Southeast Joiner City can be divided into three units, on the basis of log character and sample description. The upper unit, 450 ft (137 m) thick, is composed of very fine to microcrystalline, dense limestone, tan to brown to grayish brown in color. The middle unit, approximately 150 ft (46 m) thick, is characteristically an argillaceous limestone. The lower unit, 450 ft (137 m) thick, is similar to the upper Viola unit, but is characterized by an increase in siliceous limestone with depth. The lowermost 100 to 130 ft (30 to 40 m) of the lower Viola is predominantly dark brown to black, microcrystalline, highly siliceous limestone. Well cuttings from this section commonly contain abundant evidence of fracturing. Low matrix porosity through the entire section, combined with the lack of correlation between well potential and structural position, indicates that production is related to fracture porosity. Several methods, including both dipmeter and acoustic velocity related fracture logs, have been used to predict or identify fracturing.

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Late Abstract

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Westwater Canyon Member of Morrison Formation: Is it Really One Fan?

Three distinct fluvial packages can be recognized within the Westwater Canyon Member along the west side of the San Juan basin in New Mexico. Two of the fluival packages (lower and upper) persist to the east and can be recognized as far east as Laguna. The middle fluvial package is as thick as the lower and upper on the west side of the basin but thins rapidly to the east; fluvial sandstones cannot be recognized in this interval east of the Gallup area.

Cross-bedding studies show that streams of the lower package flowed east-northeasterly, whereas streams of the middle and upper packages flowed generally easterly and southeasterly. Volcanic pebbles are present in abundance only in the middle package. Isopach maps of each separate package, together with maximum pebble-size data, show that major fluvial axes shifted through time. Northeasterly flowing streams of the lower fluvial package had two distinct lobes. One lobe, centered near Thoreau, apparently traversed the area of the present-day Zuni uplift, and the other lobe was centered northwest of the Gallup sag, near Asaayi Lake. The easterly and southeasterly flowing streams of the middle and upper fluvial packages dropped their coarsest bed-load material just east of the Defiance uplift as they entered the basin from the west. Farther east the middle unit changes facies rapidly and loses its fluvial character. The upper package maintains its fluvial character, but contours for maximum pebble size for this interval widen considerably in an eastward direction, suggesting a more constant energy level as the streams traversed the basin.

Results of these studies are not compatible with the concept of one fan emanating from the southwest, as has been proposed by previous workers. Separating the Westwater Canyon into discrete packages and treating them separately eliminates the need to have streams enter from the southwest, "turn," and then flow southeasterly in the vicinity of the mineral belt. Both northeast and southeast paleocurrent directions occur in the Westwater Canyon, but in different parts of the member.

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