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Application of Horizontal Drilling Technology in Heterogeneous Cisco Canyon Dolomite, North Dagger Draw Field, Eddy County, New Mexico

The Upper Pennsylvanian Cisco Canyon Dolomite has been one of the most prolific oil and gas producers in Southeastern New Mexico. Within the Dagger Draw and Indian Basin Field areas of Eddy County, New Mexico, over 82 MMBO and 2 TCF have been produced since the early 1960's. Facies identification from whole core available in the North Dagger Draw field area indicates deposition along a low relief carbonate ramp. The majority of production is from two facies; the Algal Boundstone and Grainstone facies. From mapping in the area, both of these appear to have been deposited in linear strike-oriented belts. No evidence of shoreline facies have been observed; this would suggest that these deposits represent a shelf-edge or offshore, barrier-type buildup not physically connected to0 the shoreline.

A complex diagenetic history has led to a highly heterogeneous reservoir within North Dagger D00raw. A horizontal drilling program was undertaken to fully exploit the attributes of the reservoir. A total of 7 horizontal wells have been drilled to date and the results and implications will be discussed.
In 1991, the field operator drilled a medium-radius lateral hole on a downhill slant (deviation=85 degrees) along a line N45E for a distance of 2,750 ft (839 m). At TD (total depth), the well was approximately 50 ft (15 m) due west of an offset vertical well. At this depth, an FMS (Formation microScanner) log showed the lateral hole had intersected an artificial fracture created in the 1980's in the nearby vertical well. The FMS tool did not image any other significant fractures in the lateral borehole.

The intersection of the hydraulic fracture by the lateral borehole had significant economic impact0. The production rate in the vertical well jumped from a few barrels per day to an average of 70 BOPD and less than 20 BWPD. Relatively high flow rates have been maintained in the following years. Projected incremental oil recovery is about 150,000 barrels, roughly equivalent to production from an average well drilled during early life of the field. This approach – intentional drilling of a pre-existing hydrofracture - could add new life to many older, compartmentalized reservoirs.