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Creating Success from a Tight Channel Sand

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SUMMARY

Petrophysical analyses of target intervals have dictated exploration and production decisions in major companies for decades. Hydraulic fracturing has been commercial since 1950 and millions of these stimulations have been completed worldwide since. Recent applications of the technology have allowed for production from low-permeability reservoirs. Tight sand exploration for gas production has defined pay as reservoirs with at least 3% gas-filled porosity generally surrounded by intervals with significantly higher porosity values, and similar cutoffs are also used for water saturation, permeability, and clay content. Well A was drilled into a seismically defined channel exploring for high-quality reservoir facies observed in offset wells. A relatively thick sand succession was encountered, but the channelized deposits contained almost no reservoir quality. Porosity of the channel sand averages 0.033% with very thin porosity streaks not exceeding 5%. Standard formation analyses indicated the zone would not produce economic amounts of hydrocarbons. Previous wells targeting the reservoir encountered similar results and were side-tracked to alternate targets, which proved to contain significantly improved reservoir quality. A hydraulic fracture stage was performed in an attempt to connect the wellbore with potential reservoir proximal within the channel. Following the stimulation, rates exceeding 10 million standard cubic feet of gas per day flowed during the testing period. Advanced seismic interpretation and a technical review identified a second seismic anomaly within several hundred feet of the wellbore. In addition to creating a permeable pathway for fluids in a reservoir with high storage, hydraulic fracturing can be utilized to access hydrocarbons stored in reservoir facies not defined by traditional formation evaluation techniques.