

Manning Canyon Shale: An Emerging Shale Gas Resource

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The Manning Canyon Shale in north-central Utah, which has had good gas shows in the past, once again has attracted industry attention. At the north end of the San Rafael Swell, the 22 exploration wells that fully penetrate the Manning Canyon Shale, two of which were drilled in 2008, define a 600-square-mile potential shale-gas play area. Average depth to the top of the formation is 7,470 ft. Manning Canyon Shale deposition straddled the Mississippian-Pennsylvanian boundary. In the play area, approximately between Helper and Woodside, Utah, the formation is up to 1,200 ft thick, of which approximately two-thirds is dark-gray carbonaceous shale and argillaceous limestone. Associated intercalated lithologies include limestone and varicolored fine-grained sandstone and siltstone. Strata appear to alternate between marginal marine and non-marine.

Integrated analysis of well cuttings, limited core, and well logs permit identification of the stratigraphic relationships between potential gas pay and non-pay intervals. In central Utah the formation was deposited in a shallow structural depression on the craton margin between the incipient Uncompaghre uplift to the northeast and the Emery arch to the south. RockEval geochemistry and vitrinite reflectance (Ro) analyses of the organic-rich shale indicate that it is uniformly in the “dry gas” generative window. Measured Ro values from many wells are in the range 1.3-1.9 percent. Many factors point to the substantial gas resource and development potential of the Manning Canyon Shale: net organic-rich shale, limestone thicknesses on the order of 500 ft and greater, “dry gas” thermal maturities, observed gas during drilling, numerous intercalated brittle lithologies for supporting fracture stimulation of the reservoir, reasonable operating depths, a relatively large area for the gas play, and proximity to a gas transmission pipeline.