

Reservoir Characterization of the Wasatch Formation in the Hanging Rock Development Area, Southeastern Uinta Basin, Utah

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Abstract:

The Hanging Rock development area comprises the western portion of Oil Springs field, located 12 miles southeast of and 2200 ft up dip from Natural Buttes field in the southeastern Uinta Basin. The primary reservoir target in the area is the Tertiary Wasatch Formation at depths of 2500 ft to 4000 ft. The Wasatch Formation in the Hanging Rock area consists of interbedded, discontinuous, lenticular sandstones and red to green siltstones and claystones deposited in a lower delta plain environment. Sandstones within the Wasatch at Hanging Rock are predominantly chert arenites, with porosity values ranging from 15%-17% and permeability values ranging from 13 md to 37 md. Reservoirs are normally to slightly overpressured, and wells are completed naturally, without fracture stimulation. This practice enhances gas production by reducing water production, and minimizes completion costs.

Due to the discontinuous nature of sandstones within the Wasatch, the lateral and vertical distribution of individual reservoir units is extremely difficult to predict. Wells drilled on 80-acre spacing have encountered sandstones that are not correlative to offset wells. In addition, gas-charged sandstones are commonly interbedded with water-filled zones. Isotopic analysis of gas produced from the field suggests that coals in the underlying Mesaverde Group are the source and that the gas is thermogenic in origin. The gas is thought to have migrated vertically up through local faults and fractures. Various mapping techniques have been employed in an attempt to predict the distribution of individual reservoir units.

This play has relatively low economic risk due to both the relatively low drilling and completion cost and the relatively high current price of natural gas. Because of that, along with the geological complexity of the reservoirs, a “statistical” strategy has used to develop the field. This talk will review what we have learned about these reservoirs through recent drilling activity, and also the numerous challenges associated with this type of play.