

Shale gas production in the Rockies, predictable evolution and penultimate destination: Examples from the San Juan Basin (SJB), USA

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ABSTRACT

Unconventional reservoir study typically passes through five distinct chronologic stages:

(1) Initially, a significant show is encountered in a shallow zone on route to deeper conventional objective(s). Mudlog show is ignored because of inadequate matrix porosity.

(2) Later, mudlog show cannot be ignored because production potential is obvious. Ensuing production is usually ascribed to presence of natural fractures.

(3) Geologic and engineering studies are undertaken in subsequent years in order to comprehend the unconventional deposit.

(4) Somewhat concurrently with (3) above, various stimulation procedures are attempted over time in order to maximize production from a vertical wellbore.

(5) Finally, horizontal or deviated wellbores are attempted in an effort to exceed optimized vertical recoveries.

The Lewis Shale (Campanian) has dutifully followed this chronologic progression. After operators acquired abundant geologic and engineering data, vertical recompletions yielded both production triumphs and disappointments. In 1991, a horizontal well was drilled into a traditional coarsening-upward, sandy mudstone pulse usually targeted for vertical recompletion. Although taken off compression, this well produced 0.85 BCF from a 2100-foot horizontal leg, and according to decline curve projection, should produce approximately ~1 BCF additional. Because the Lewis interval contains numerous, correlative coarsening-upward pulses within its 1200-foot thickness, multilateral horizontal or deviated wellbores are subsequently possible for this behind-pipe resource. Other "shales" within the basin are in varying stages of comprehension as described above. Thus, potential for horizontal/deviated wellbores bodes well for future efforts in not only the SJB, but also for analogous Cretaceous shales along the entire Western Interior Seaway.