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Debra Rutan¹, E. Charlotte Sullivan² (1) Southwestern Energy, The Woodlands, TX (2) University of Houston, Houston, TX

Morrow incised valley fill, Eddy County, New Mexico

Early Pennsylvanian Morrow gas and condensate reservoirs of the northern Delaware Basin have been largely interpreted as low-accommodation fluvial, deltaic and nearshore sandstones. In contrast, core, wireline logs and image logs from 30 wells drilled since 1998 in the Logan Draw- Crow Flats fields of northern Eddy County document valley fill, with 400 ft (122 m) of incision into the underlying Mississippian strata. The arkosic siliciclastics of the lower part of the Morrow Formation can be divided into three genetic packages. The lower two packages represent valley fill and the upper package represents transgressive marine deposition of thin, shore-parallel sands. The lowermost package records a progression of retrogradational to progradational estuary fill, overlain by marine shales. Estuary mouth sands form the best reservoirs in this package. The middle package consists of marine sands and shales in the lower part and stacked sands, interpreted as point bar deposits, in the upper part. Stacked sands are angular, fine-to-coarse grained, upward fining, and contain multiple scour surfaces. These sands incise older marine and fluvial deposits, and form excellent reservoirs. The marine sands are poor reservoirs. To the south, the stacked sands form a composite, strike-oriented sand body 250' (76 m) thick, interpreted as a wave dominated delta. These sands generally lack marine cements and form excellent reservoirs. The overlying marine shales form the base of the uppermost package. The thin, strike-oriented, marine sands of the uppermost unit form poor reservoirs except where cut by dip-oriented tidal channels.