[PS]Stratigraphy and Petrophysics of Gas-Producing Parasequences in the Rollins Sandstone of the Mesaverde Group, Mamm Creek Field, Piceance Basin, Northwest Colorado*

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Abstract

The Rollins Sandstone Member of the Iles Formation produces gas from a series of marine shoreface parasequences that pinchout updip along the northwest plunge end of the Divide Creek anticline in the southeast Piceance Basin in northwest Colorado. Very high well density (10- and 20-acre) allows detailed correlation of upward-coarsening parasequences. In a distal setting, the tops of the parasequences are overlain by marine shale interbeds that thicken in a seaward direction. The shale interbeds pinchout in a landward direction, but in these areas the tops of the parasequences can be identified by a trough cross-stratified, low gamma-ray upper shoreface sandstone overlain by a burrowed, higher gamma-ray lower shoreface sandstone. Rollins shoreline orientation can be accurately determined by mapping the landward pinchouts of these shale interbeds. The productive intervals of the Rollins can be identified on open-hole logs by a combination of neutron-density cross-over, high resistivity, and relatively low calculated water saturations. Productive intervals can also be identified by mud-log gas shows and gas seeps on borehole image logs. Maps of the productive portions of the Rollins parasequences show a series of shore-parallel lenses that shale-out in a seaward direction.

Reference

Van Wagoner, J.C., R.M. Mitchum , K.M. Campion, V.D. Rahmanian, 1990, Siliciclastic Sequence Stratigraphy in Well Logs, Cores, and Outcrops: Concepts for High-Resolution Correlation of Time and Facies: AAPG Methods in Exploration Series, no. 7, 55 p.

Stratigraphy and Petrophysics of Gas-Producing Parasequences in the Rollins Sandstone of the Mesaverde Group, Mamm Creek Field, Piceance Basin, Northwest Colorado

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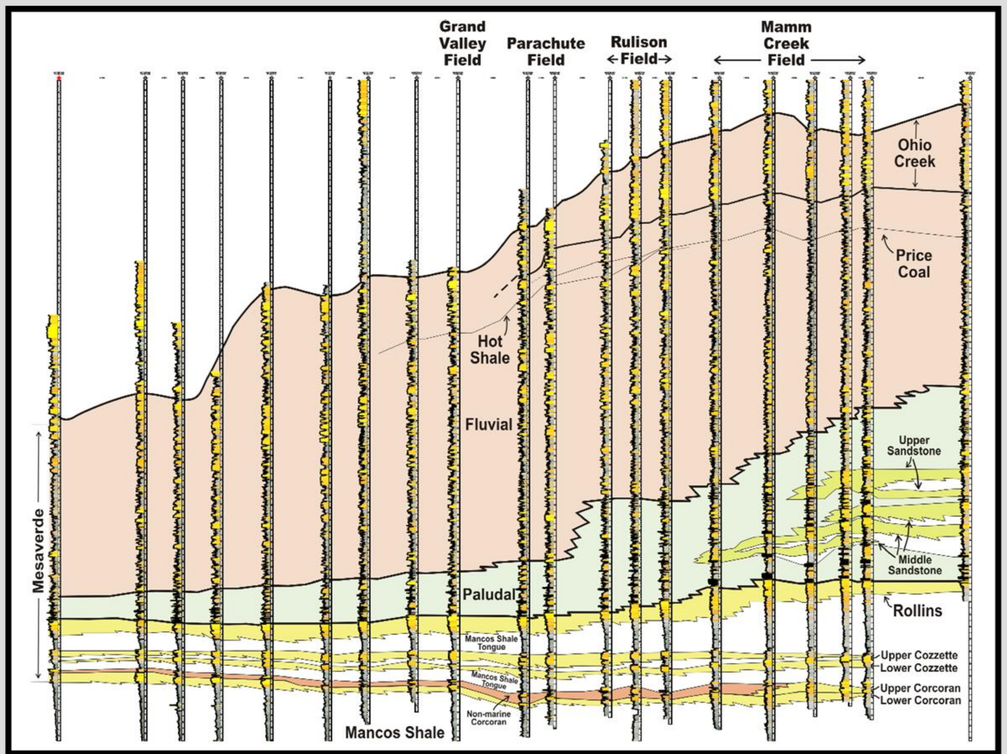
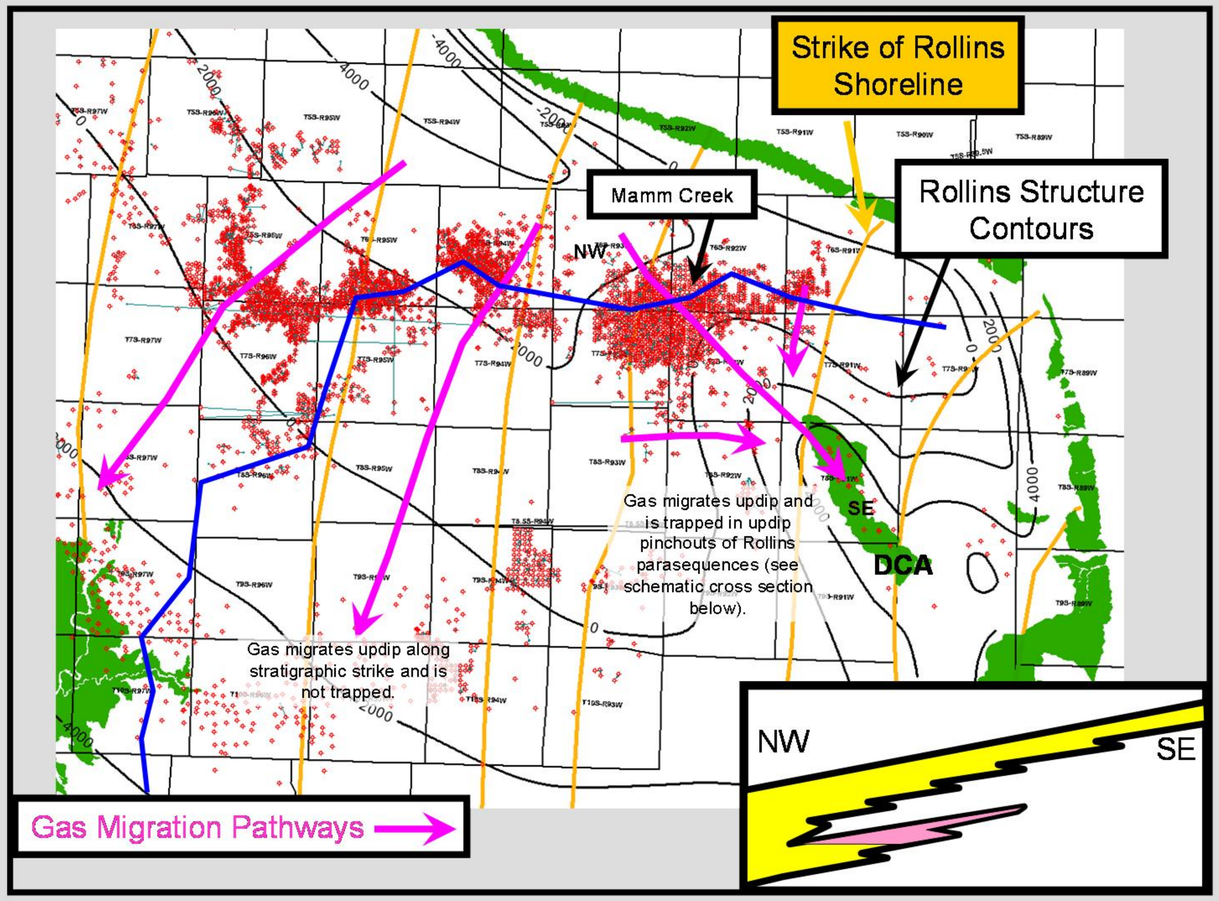
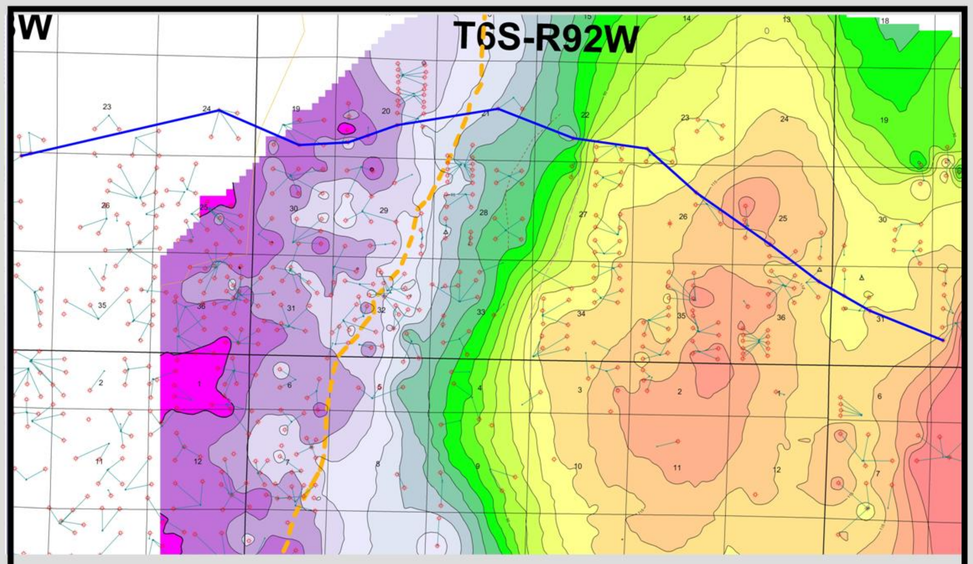
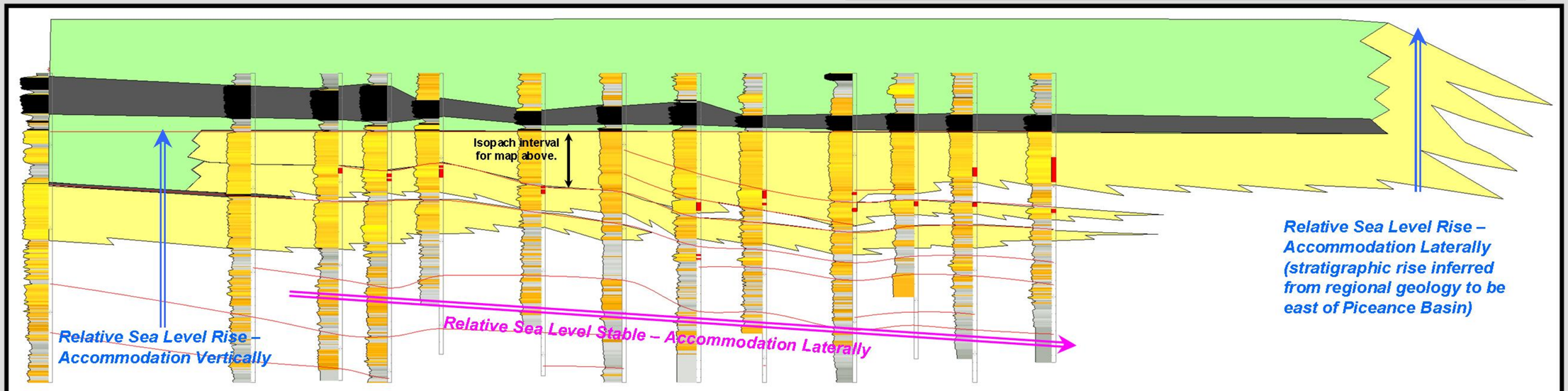


Regional cross section showing the stratigraphy of the Mesaverde Group in the Piceance Basin. Cross section line shown in blue on map above top right.

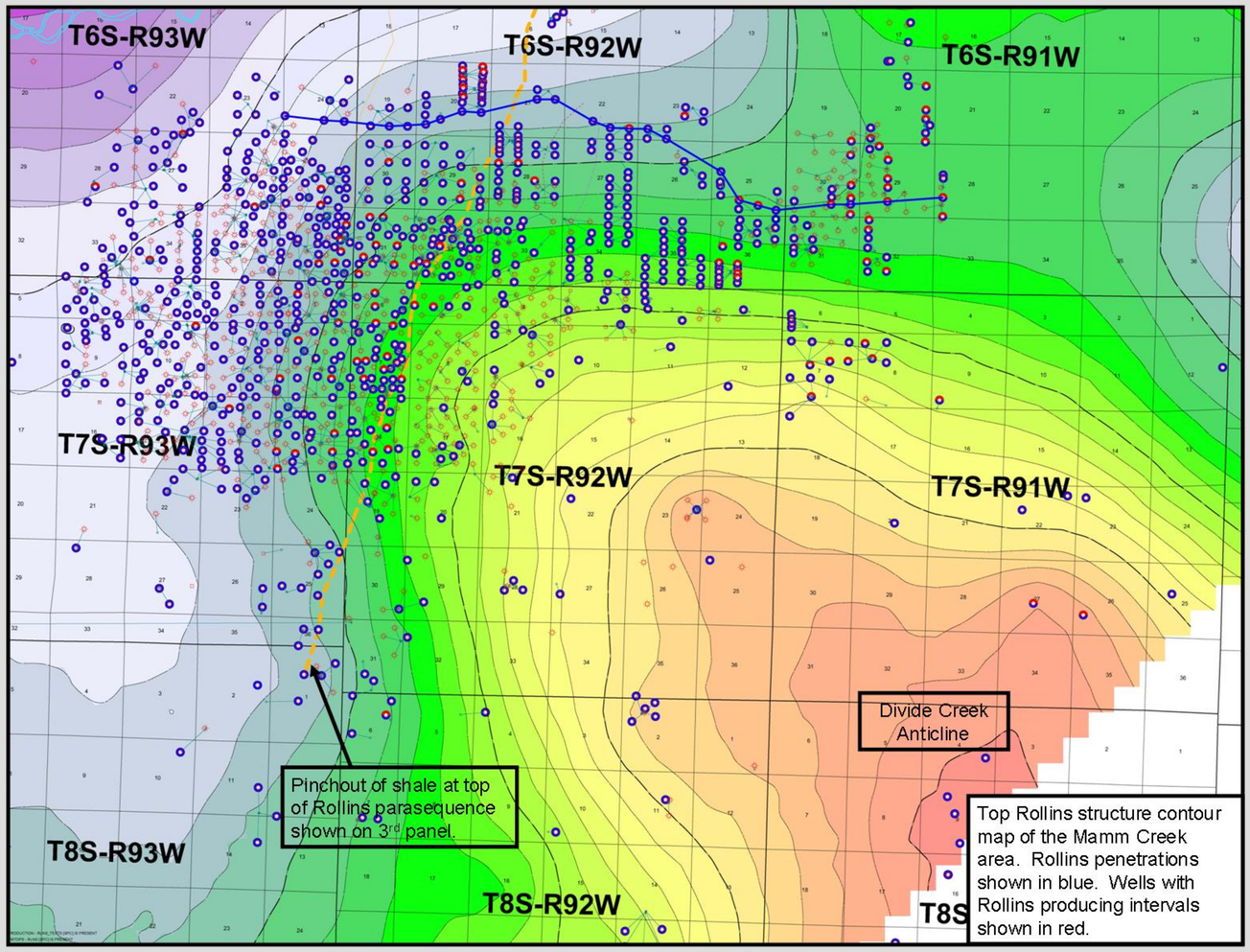




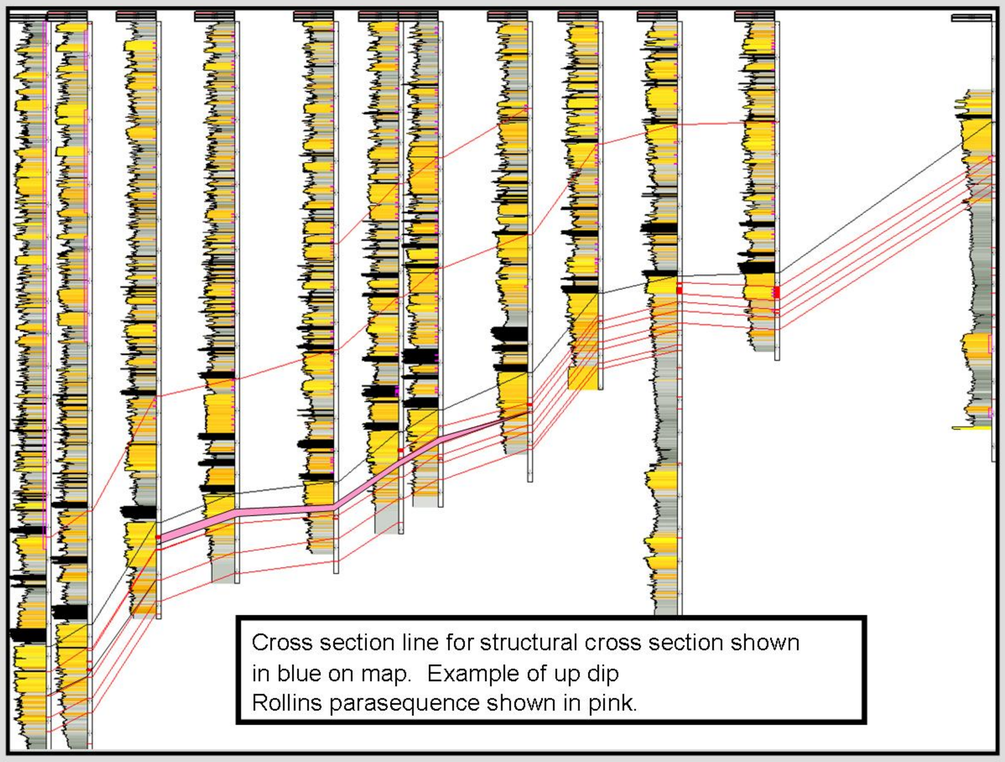
Isopach map of interval from top of Rollins to top of parasequence shown on cross section below. Orange dashed line shows shale pinchout discussed on 3rd panel.



Different progradational styles of the Rollins based on varying accommodation. During periods of relative sea level rise, parasequences stack vertically, the shoreface shows stratigraphic rise, and coals accumulate. During periods of stable relative sea level, the parasequences are formed by autocyclic depocenter shifting and the shoreline progrades without stratigraphic rise. Cross section line on map above middle right. Based on discussions with Paul Devine.

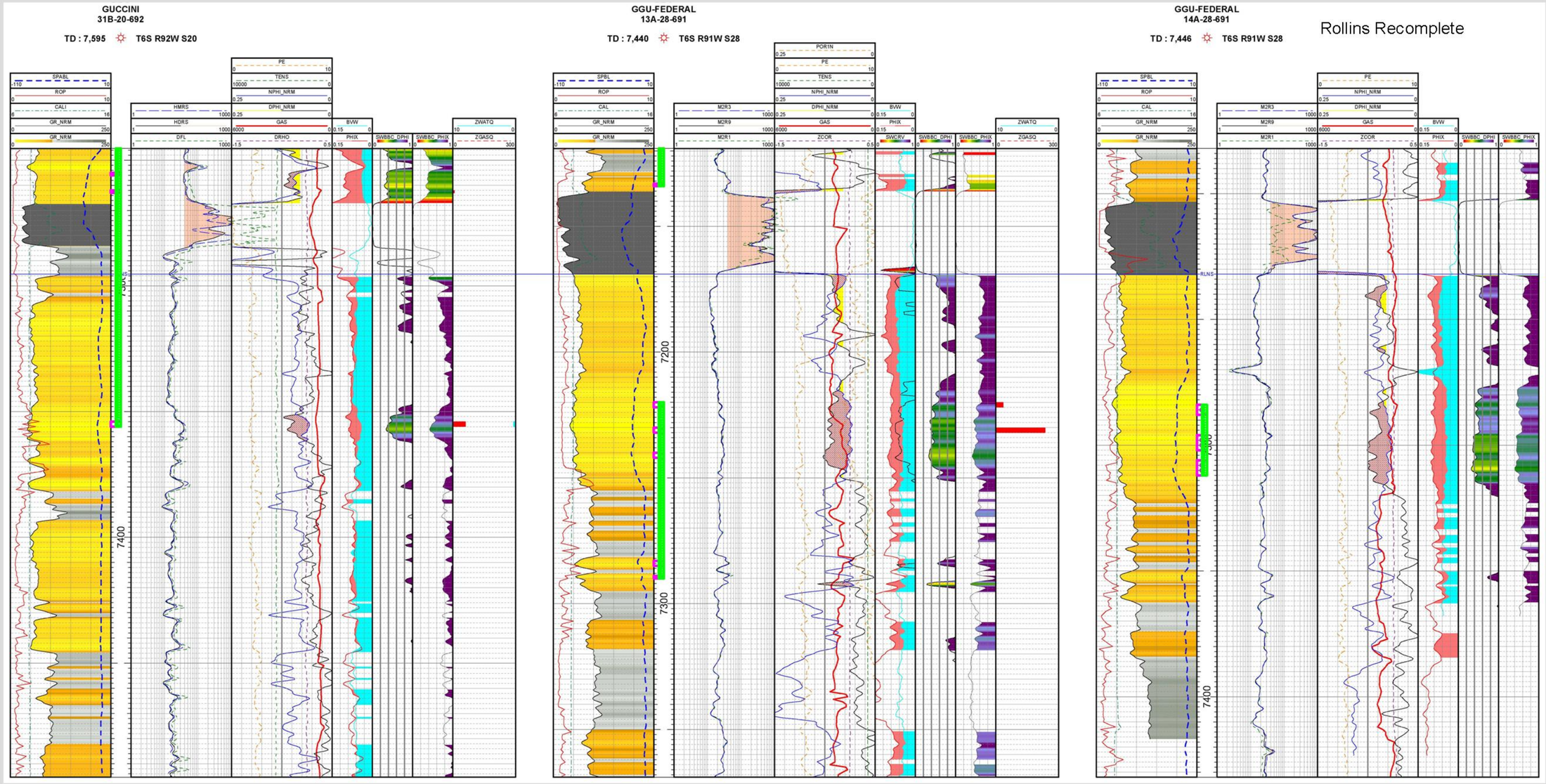


Top Rollins structure contour map of the Mamm Creek area. Rollins penetrations shown in blue. Wells with Rollins producing intervals shown in red.



Cross section line for structural cross section shown in blue on map. Example of up dip Rollins parasequence shown in pink.

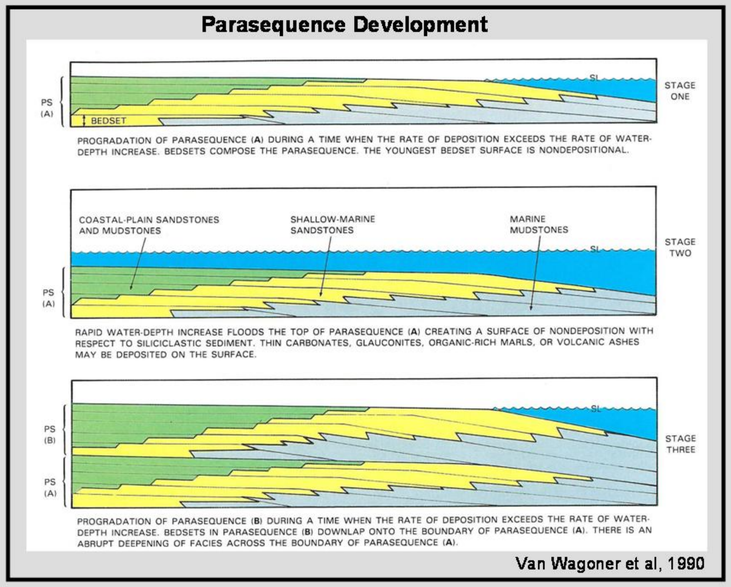
Three Rollins completions that have production information

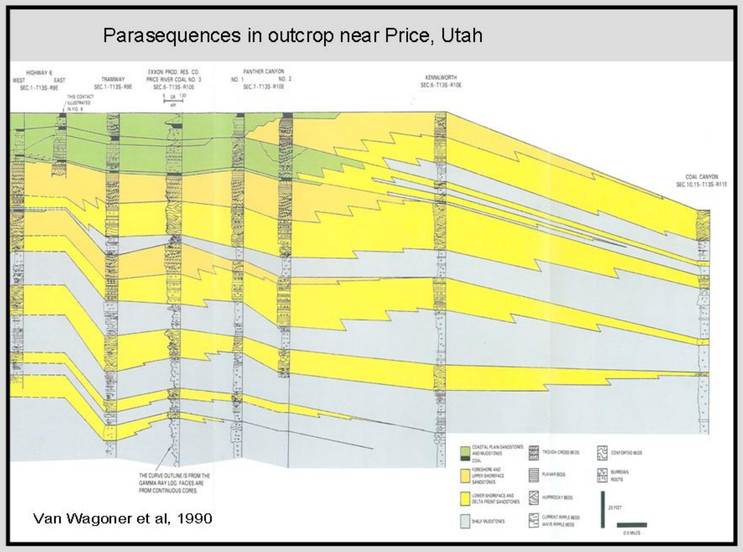


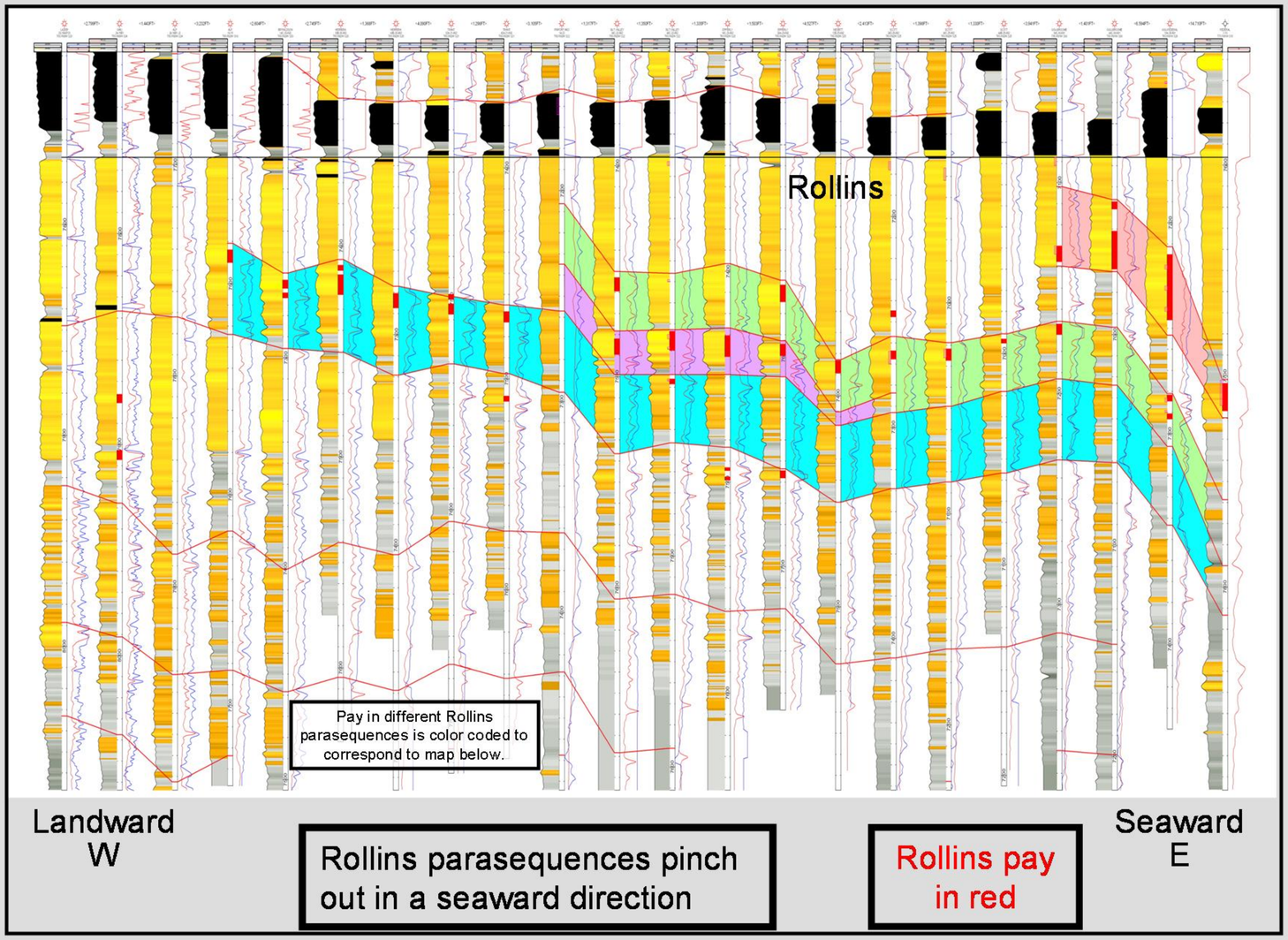
62 MCFD, <1 BWPD
0.1 BCF

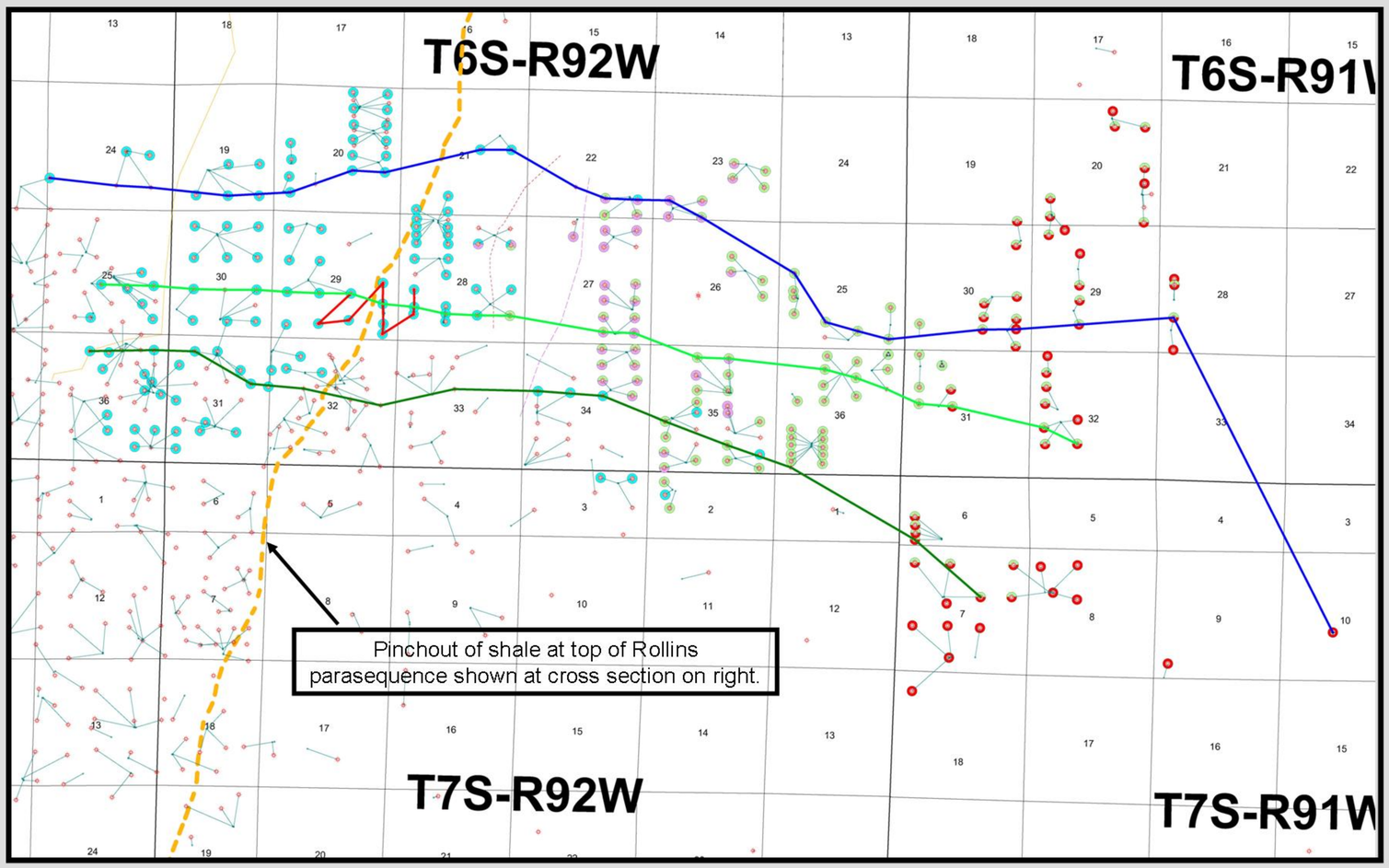
270 MCFD, <1 BWPD
0.7 BCF

365 MCFD, 0.5-0.7 BCF

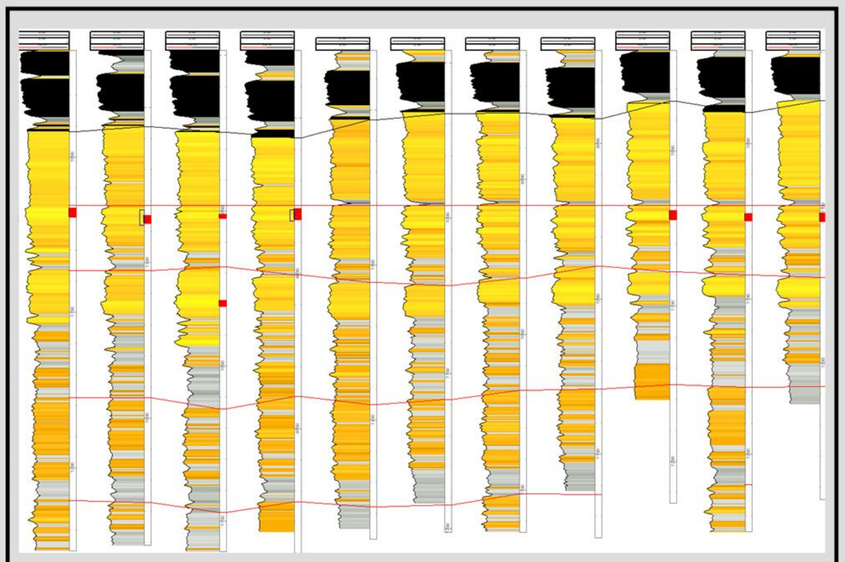




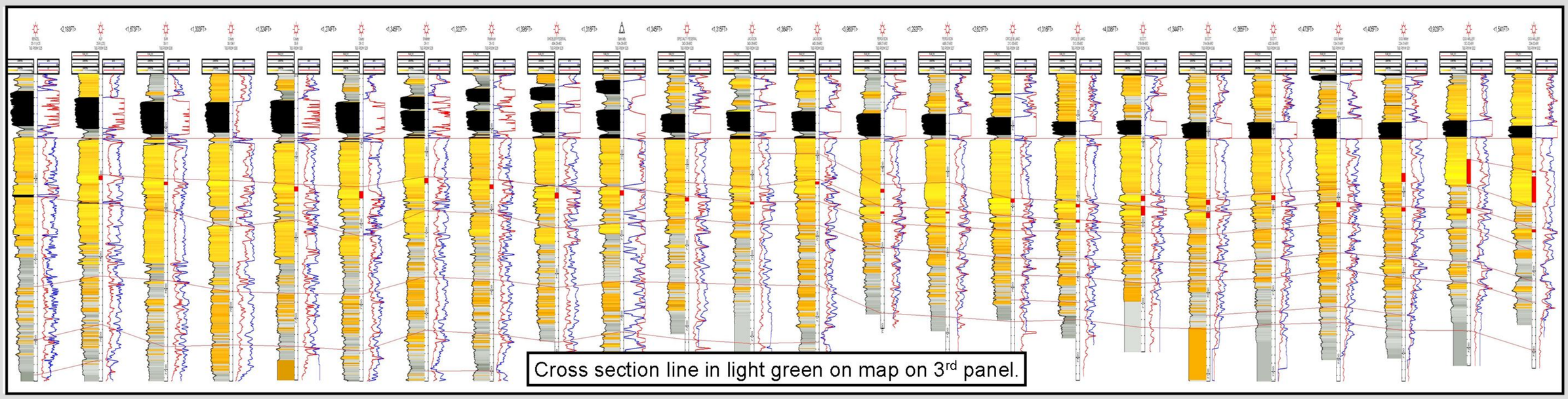


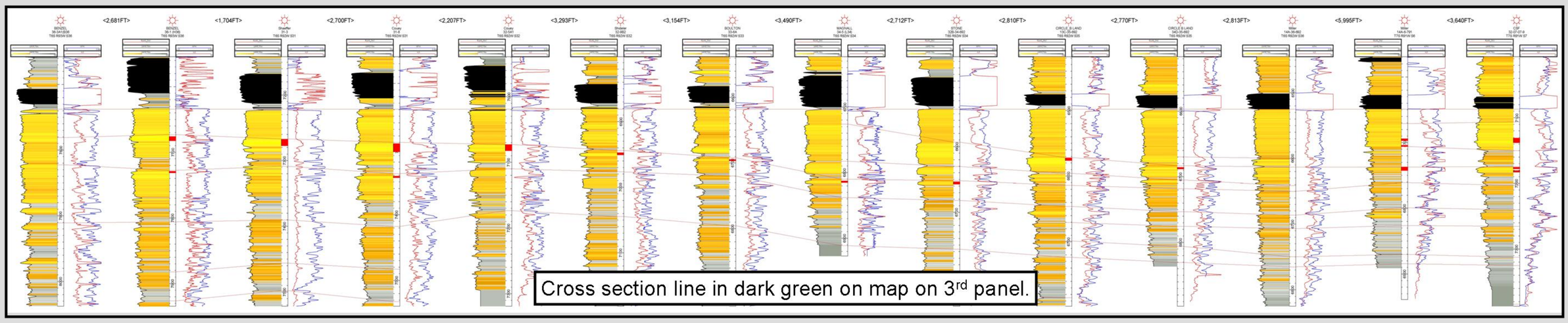


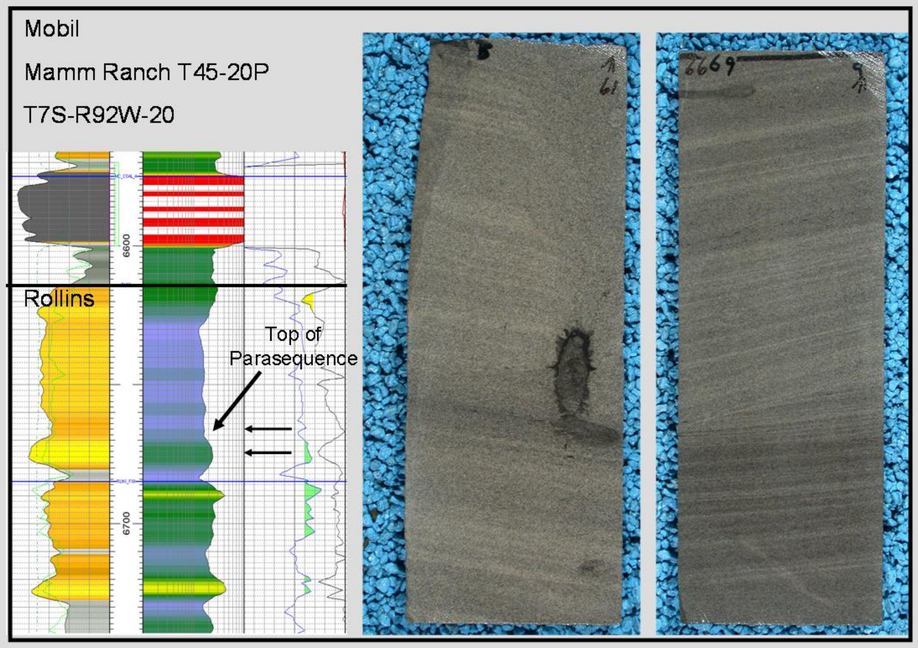
Map of Mamm Creek Field area showing pay in different Rollins parasequences. Pay is color coded to correspond to cross section above right. Cross section lines are for sections on this panel and the 4th panel. Only Rollins penetrations are shown. Pay was not picked on cased-hole logs and wells that penetrated only the uppermost Rollins, as well as wells in the southwest part of the map area.

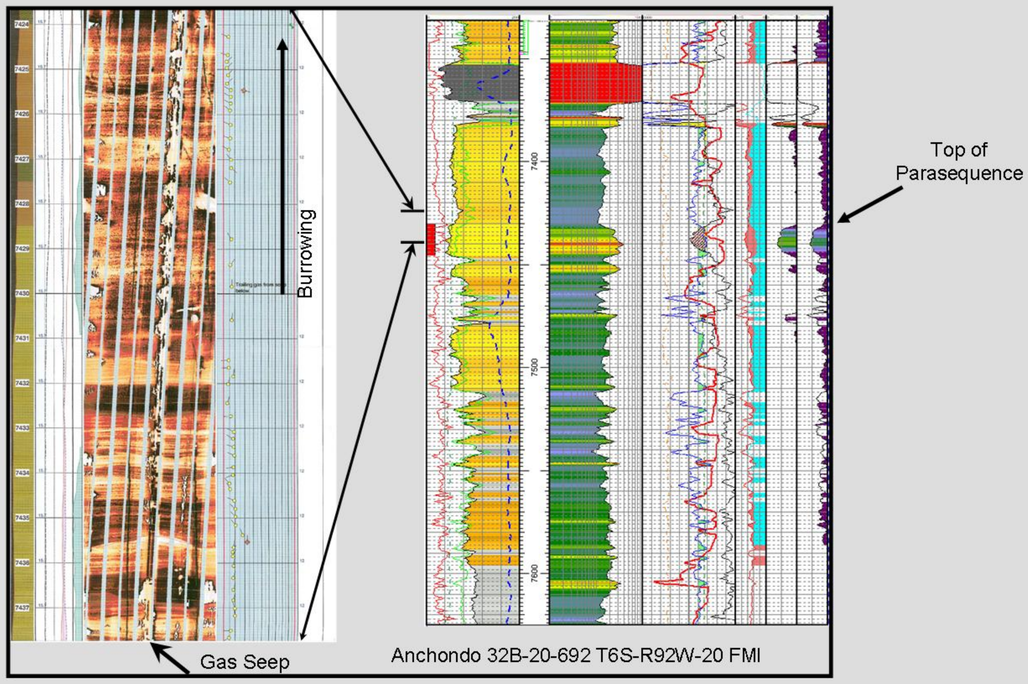


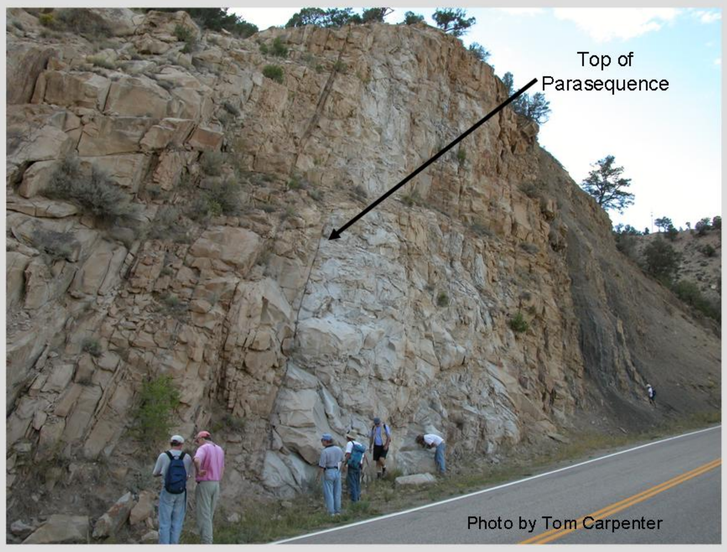
Cross section showing pinchout of shale at top of Rollins parasequence. Cross section line shown in red on map on left.


Cross section line in light green on map on 3rd panel.


Cross section line in dark green on map on 3rd panel.


Mobil
Mamm Ranch T45-20P
T7S-R92W-20
Rollins
Top of
Parasequence


Burrowing
Top of
Parasequence
Gas Seep
Anchondo 32B-20-692 T6S-R92W-20 FMI


Top of
Parasequence
Photo by Tom Carpenter


Top of
Parasequence
Photo by Tom Carpenter


Top of
Parasequence
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