Lithostratigraphy and Chronostratigraphy of Middle Tertiary Strata in the Subsurface of the Central San Joaquin Basin, California

Scott Lewis and David P. Brewster
Black Coral LLC., Denver, CO
jslewis@quantstrat.com

Aregional analysis spanning over 15 years and integrating thousands of wells and more than 20,000 mi of 2-D seismic data, has culminated in a sequence stratigraphic model for middle Tertiary strata in the subsurface of the central San Joaquin basin, California. The proposed model preserves certain elements integral to various early studies of the basin, while reconciling numerous confounding nomenclatural problems and facies architecture issues of the late Oligocene through middle Miocene section (including Tumey, Vaqueros, and Temblor Formations). This model is important not only for regional sequence stratigraphy, but also for local oil and gas exploration.

Because of the effects of several well-documented premiddle-Miocene-aged unconformities, much of the section of interest does not exist in the well-studied outcrops on the west side of the basin. Also, some predominantly seismicbased studies in the center of the basin have missed the detail necessary to resolve the component systems tracts of the main sequences. This study focuses on a relatively small part of the basin east of Coalinga oil field and west of the basin axis where several of these unconformities dramatically express themselves in the subsurface both in well logs and on seismic data. The information derived from this area of complex stratigraphy provides critical insight into the much broader regional sequence stratigraphic framework and tectonic history of the basin.

Locally, tightly integrated seismic and well data interpreted within this refined sequence stratigraphic framework provide the exploration tools necessary to accurately correlate and map in this stratigraphically complex and tectonically active area. Specifically, a very detailed understanding of stratigraphic relationships is necessary to explore for stratigraphically trapped sandstone reservoirs of the Tumey Formation (Leda sands), Vaqueros Formation (Lower Vaqueros, Upper Vaqueros, and Allison sands), and Temblor Formation (Burbank and other sands).