Clark, Michael S. (ChevronTexaco, Inc, Bakersfield, CA)

**BASIN ARCHITECTURE OF DIATOMITE-TURBIDITE COMPLEXES IN THE MONTEREY- STEVENS PETROLEUM SYSTEM, SAN JOAQUIN BASIN, CALIFORNIA**

Stevens facies turbidites and debris flows, and Antelope facies diatomites of the Miocene Monterey Formation rimming the tectonically active margins of the San Joaquin basin, California represent contrasting depositional responses to paleotopography and climate. Because both facies contain Monterey-derived oils, they represent one petroleum system.

Stevens sandstones in the south part of the basin include a westward-prograding debris flow apron on the east margin; northward-prograding, fan-shaped turbidite complexes in the south; and eastward-prograding, debris flow lobes ponded in synclinal lows along the faulted west side, with channels cutting basinward across paleohighs connecting one ponded apron to the next. To the north, Antelope diatomites and shales replace the Stevens. Coarsening-upward, diatomite-to-sandstone cycles (parasequences) within the Antelope accumulated during upwelling on the western margin, on paleohighs distal to the Stevens. Less diatomite in the basin center and eastern margin indicates upwelling was confined to the west.

Two Antelope diatomites (cherts) interbedded with the Stevens may indicate cool climate with glacial advance during sea-level lowstand. If so, Stevens sandstones separating these cherts represent highstand deposition, whereas most interpret the Stevens as lowstand facies. Possibly, alluvial fans stored sand on the basin margins during lowstands, contemporaneous with marine upwelling that facilitated diatomite deposition on submarine highs. Reworking of drowned fans during subsequent sea-level rise sourced sand-rich fans, lobes and aprons. Thus, Stevens “highstand turbidites” account for most of 3 BBO produced from the Monterey-Stevens system, with minor contribution from fractured “lowstand diatomites”.