

Stratigraphy, Paleogeography, and Hydrocarbon Migration of the Shallow Oil Zone in Elk Hills and Coles Levee Fields, San Joaquin Basin, California

Ariel Auffant¹, Jan Gillespie², Bill Long³, and Michael Clark¹

¹ChevronTexaco, Bakersfield, CA

²California State University, Bakersfield, CA

³Occidental Petroleum, Bakersfield, CA

aauffant@chevrontexaco.com

The type of hydrocarbons produced from the shallowmarine sandstones of the lower Etchegoin Formation changes from dry gas on the western Bakersfield Arch (North and South Coles Levee fields) to oil and associated wet gas (pure methane) in the western part of the Elk Hills field. This poster addresses: 1) the relationship between the types of produced hydrocarbons to the reservoir heterogeneity in the lower Etchegoin Formation, and 2) the Pliocene reservoir architecture and paleogeography in the study area. The Calitroleum zone of the lower Shallow Oil Zone (SOZ) produces oil and associated wet gas from a series of silty, bioturbated, shallow-marine sands in the western part of the Elk Hills field. The Calitroleum zone in the Coles Levee fields produces dry gas from small, isolated, sandstone reservoirs that are coarser-grained and less silty than their counterparts at Elk Hills. Because the Calitroleum zone has not been productive in the easternmost Elk Hills, this area may represent a discontinuity separating two distinct petroleum systems within the San Joaquin Basin. This discontinuity may represent a pronounced facies change within the section due to faulting and/or a combination of both. The lower SOZ section at Elk Hills and Coles Levee is characterized by a series of northeast-trending, listric, normal faults, which crosses the axis of the Elk Hills and Coles Levee anticlines. These faults achieve maximum displacement in the overlying sediments of the upper SOZ. A better knowledge of the Pliocene reservoir heterogeneity trends and oil migration pathways in the Bakersfield Arch will enable more effective secondary recovery techniques in the lower Etchegoin Formation reservoir at Elk Hills and Coles Levee fields, and may ultimately add to additional dry gas discoveries.