

Four Petroleum Systems in the San Joaquin Basin, California

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Four petroleum systems in the San Joaquin basin are the Moreno(!), Kreyenhagen-Temblor(!), Tumey-Temblor(.), and Antelope-Kern River(!). The four oil systems with associated wet gas account for all liquid and associated wet-gas production and recoverable reserves of 14.6 billion barrels of liquid and 18.4 trillion ft³ of gas in the San Joaquin basin. Petroleum traps on the west flank are structural and contain 10.6 BBO and 16 TCFG, whereas the east flank traps are mostly stratigraphic or subtle structures and contain 4 BBO and 2.4 TCFG.

The Moreno(!) is the smallest petroleum system that reportedly produced less than a million barrels of oil and almost 4 BCFG. The gas-to-oil ratio (GOR) in ft³/bbl is about 24,000, a gas-prone system. Oil City pool in the Coalinga field and the Cheney Ranch field are the largest accumulations. Based on oil-source rock comparison, the Moreno Formation is the source of the hydrocarbons with the pod of active source rock to the southeast of the Coalinga field.

The Kreyenhagen-Temblor(!) is the second largest system, with cumulative production and remaining reserves of 1.7 BBO and 2.4 TCFG. The GOR of this system is 1400. Based on oilsource rock correlation, the Kreyenhagen Formation generated the fluids that originated from a pod of active source rock in the Buttonwillow depocenter. The Coalinga field produces from the Temblor Formation, the largest pool in the system.

The Tumey-Temblor(.) has cumulative production and remaining reserves of 0.5 BBO and 2 TCFG, a GOR of almost 4000. Even though a oil-source rock correlation is lacking, the geochemistry of the oil and the proximity of the accumulations near the Tumey indicate a hypothetical link of the oil to the source rock. The location of the Tumey pod of active source rock is just above the Kreyenhagen pod.

The Antelope-Kern River(!) is the largest system in the basin, with cumulative production and remaining reserves of 12.3 BBO and 13.9 TCFG, and a GOR of almost 1200. Oilsource rock comparison show that the Antelope biogenic shale generated petroleum from a pod of active source rock in the Buttonwillow and Maricopa depocenters. The largest documented pool that contains oil from the Antelope source rock is in the Kern River field. More oil may be in the Stevens sandstone in the Elk Hills and Midway-Sunset fields, except that all production is co-mingled. The time of generationmigration-accumulation for all these petroleum systems is within the Plio-Pleistocene.