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## **Petroleum Charge Analysis of the Southern San Joaquin Basin, California: Implications for Future Exploration**

Southern San Joaquin basin petroleum charge was analyzed to evaluate basin prospectivity in areas with low exploration success. Cuttings data were used to map SPI and to calibrate transformation. Petroleum generation was calculated from SPI and transformation maps. Migration was evaluated using structural configuration and stratigraphic focusing. Petroleum charge was then compared to oil-in-place and leakage to determine areas with significant charge, but little discovered petroleum.

Generation from Tertiary source rocks is restricted to the Maricopa subbasin, Buttonwillow depocenter, Valley Syncline and Avenal Syncline. All significant petroleum accumulations are located where focused charge from these areas is probable. Oil generation is Pliocene to Recent, with mostly Pleistocene generation. Tertiary source rocks in the deepest parts of the basin are barely in the gas window.

Structural noses shield the east-central part of the basin from most charge and focus this oil towards the Bakersfield nose and Helm field area. Generation occurs east of these barriers, but structural traps are absent and stratigraphic trapping is rare due to unfavorable orientation of known sandstone pinchouts. Essentially no Tertiary oil was generated in the western disturbed belt, so charge to the western part of the disturbed belt requires an older (Cretaceous?) source rock or a migration pathway from the east destroyed by subsequent deformation. Unassociated thermogenic gas potential is limited to the deepest parts of the basin by thermal maturity. Deep-basin oil potential is limited to fractured reservoirs, because deeply buried sandstones have matrix permeability too low for economic oil production rates.