USGS Assessment of Undiscovered Oil and Gas Resources in the West-Side Fold and Thrust Belt, San Joaquin Basin, California

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Two nearly coincident assessment units (AU) were evaluated for the USGS assessment of the upper Neogene west-side fold-thrust belt of the San Joaquin Basin. The deeper one is sourced by Eocene shale of the Kreyenhagen and Tumey Formations and includes all strata below the Monterey Formation and equivalents, down to 14,000 ft. The shallower AU is sourced by the Monterey Formation and comprises the Monterey and all overlying strata. Petroleum generation and migration in both AUs began about earliest Pliocene time and continues to the present.

The Eocene-sourced West Side Fold Belt AU includes oil and associated gas accumulations in sandstones of the Kreyenhagen, Tumey, and Temblor Formations. Reservoir sandstones represent a range of marine depositional settings from submarine fans to nearshore deposits. Trap types include stratigraphic, combination, structural, and tar seal traps. This AU is well explored at shallow levels, but less so at depth. Undiscovered accumulations will mainly be in the deeper part of the AU and could include one or two as large as a few tens of millions of barrels along with some smaller accumulations.

The prolific Miocene-sourced West Side Fold Belt AU comprises moderate- to low-gravity oil accumulations trapped in siliceous and diatomaceous basinal mudstones of the Monterey, in submarine fan sandstones ("Stevens") within the Monterey, and in overlying Pliocene to Quaternary shallow-marine to non-marine strata of the Etchegoin, San Joaquin, and Tulare Formations. This AU is quite densely drilled, and the largest accumulations have probably all been discovered. Undiscovered accumulations are most likely to be stratigraphic, diagenetic, or combination traps in Monterey siliceous rocks or "Stevens" sandstones. A few might be as large as a few tens of millions of barrels, similar to Landslide field; most will be smaller.