

**USGS Assessment of Undiscovered Oil and Gas Resources in the Siliceous Rocks of the Monterey Formation,
Central San Joaquin Basin, California**

Allegra Hosford Scheirer¹, Donald L. Gautier¹, and
Marilyn E. Tennyson²

¹U.S. Geological Survey, Menlo Park, CA

²U.S. Geological Survey, Denver, CO

allegra@usgs.gov

Recent discoveries of North Shafter and Rose fields confirm the existence of economically recoverable oil accumulations in diagenetic traps in siliceous rocks of the Monterey Formation, central San Joaquin Basin, California. The USGS recently completed an assessment of the undiscovered hydrocarbon potential of these accumulations. For the assessment, the play concept involves burial of a thick sequence of diatomaceous shale and the consequent diagenetic conversion of opal CT to quartz-phase rocks. Both clay content and sand content affect the rate of this transformation, resulting in diagenetic facies with a complex spatial distribution. Reservoir facies consist of oil-saturated, highly-fractured, quartz-phase rocks. Oil generation within these reservoirs probably occurred either in place or within short migration distances. Seals consist of opal CT-phase rocks that have little or no oil saturation and poor permeability updip from fractured quartz-phase reservoirs.

In plan view, the assessment unit is bounded on the north and east by the limit of siliceous Monterey rocks. The southern boundary is the northern limit of Stevens sandstone, and the western boundary is the eastern and northeastern limit of anticlinal folds on the basin's west side. The assessment unit is limited vertically to the rocks of the Monterey Formation, which lie between 4000 and 14,000 ft depth.

Successful exploration of this play is facilitated by highresolution, 3-D seismic imaging and horizontal drilling technology. Ultimate recoveries at North Shafter and Rose fields exceed 10 million barrels. The mean estimate of undiscovered oil is about 125 million barrels distributed in many fields, most of which are smaller than North Shafter and Rose.