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The North Shafter and Rose Oil Fields: A Seismically Defined, Diagenetic Stratigraphic Trap in the Miocene McLure Shale, San Joaquin Basin, CA

The North Shafter and Rose Oil Fields, located in the eastern San Joaquin Basin of California, are the most recent discoveries in the Miocene McLure Shale of the Monterey Formation. Discovered in 1983, the field was recognized as a potential oil producer but was not economic at the time. In 1995, several attempts at vertical wells proved successful enough to warrant horizontal drilling. Horizontal drilling along with strategic wellbore orientation and with new completion and stimulation techniques have made the program viable.

The McLure Shale is an excellent source rock and has been a prolific reservoir rock in the fractured reservoirs on the west side of the San Joaquin Basin. North Shafter and Rose oil fields are located on the east side of the basin within a very subtle diagenetic trap. The reservoir and trap are the results of silica diagenesis that alter the diatomaceous shales from a non-reservoir opal CT phase to a quartz-phase reservoir rock.

Reservoir characterization has been performed by a number of methods including extensive core, petrophysical, and engineering analysis. Understanding the rock properties has led to successful seismic model that has been used to delineate the extent of the reservoir using p-wave and converted wave 2-D seismic data.

The North Shafter and Rose Oil Fields represent an optimum combination of circumstances to allow for diagenesis to occur at the same temperature as hydrocarbon generation. Utilizing seismic data and horizontal drill technology have been key in the exploitation of this subtle, but prolific unconventional play.