

Mt. Poso Oil Field Keeps On Ticking: Geology, Technology, and Market Forces Drive the Life Cycle of This Giant Field

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The life cycle of Mt. Poso oil field is typical of many giant oil fields in California: discovery and peak primary production prior to 1930; a resurgence of drilling and production during WWII; declining oil production into the 1960s; consolidated operations, unitization, and steam-flooding by a major oil company in the 1970s; record-high oil production in the 1980s; present-day primary production and partial re-development by independent oil companies.

Geology, technology, and market forces have driven the Mt. Poso life cycle. The early explorers targeted the Vedder Sand, a high-permeability, high-porosity, high-initial oil saturation, and laterally continuous sand. Thermal technology and the vision of a large Vedder steam flood led Shell Oil Company to acquire and unitize the entire leasehold in main Mt. Poso field in the 1960s. Shell increased oil production to 25,000 BOPD in the 1980s.

Directly above the Vedder Sand is the low-permeability, low-oil saturation, clay-rich, Pyramid Hill Sand. The Pyramid Hill air permeability averages 40 md Montmorillonite and mixed-layer illite/smectite clays comprise up to 30% of bulk volume. These factors limit injectivity of water, steam, and gas, making secondary and enhanced recovery uneconomic to date. Pyramid Hill primary production benefits from claybound water (low water cuts) and pre-heating by the Vedder steam chest (reduced oil viscosity).

At a time of low oil prices, Mt. Poso became a non-core asset to Shell and was sold to Plains Exploration and Production Company in March 1999. Plains employed low-cost drilling operations and hydraulic fracturing technology to aggressively implement its vision of 500 5-BOPD Pyramid Hill wells. In five years, Plains drilled and hydraulically fractured over 300 wells. Oil production climbed from 800 BOPD at acquisition to 3000 BOPD in May 2001. In December 2003, 370 Pyramid Hill producers were pumping 1800 BOPD.