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New Pool Definition, Delineation and Development: The P5 Reservoir, Safah Field, Oman

by

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ABSTRACT

In a previous century, in a far away land, a San Joaquin Valley Geological Society geologist wandered among the red dunes of the Rub' al Khali desert. There were strange names (Safah, Shuaiba, Stromatoporoid), strange rocks (isn't "carbonate" something in fizzy drinks), strange wells (multilateral horizontals with barefoot completions) and camels too! "I guess we're not in Kansas any more, are we Toto?".

Discovered in 1983, the Safah Field in Northern Oman produces from the Aptian Age Shuaiba carbonate reservoir. By 1998, there had been 159 wells drilled in the field and yet the up-dip limit of the field had still not been defined. An up-dip depositional limit for the field was interpreted from 3-D seismic amplitude data in 1998. Based on this interpretation three successful horizontal wells were drilled within a seismic amplitude anomaly, enlarging the productive area of the field.

Later in 1998, an exploration well drilled 11 km beyond the supposed up-dip pinchout of Safah Field penetrated the same porous limestone unit that was present at Safah Field, but the unit was not hydrocarbon-bearing at this up-dip location. An up-dip stratigraphic limit of the field now seemed to be unlikely for such a laterally continuous unit. Re-interpretation of the Safah Field well data led to the recognition that the thin reservoir unit in the western part of Safah Field was a separate accumulation, not connected to the main Safah Field. Data from the re-processed merged 3-D seismic volume suggested that a regional transverse fault system with minimal vertical throw could provide the up-dip seal to this newly defined reservoir (named the P5 Reservoir). Well S-165 drilled in 1999 confirmed the presence of a trap and subsequent wells defined the continuous nature of the fault system and proved that an across-fault seal was the up-dip limit of this reservoir.

BIOGRAPHY

Stan Stearns Bio

Graduated from Stanford in 1983 after earning a B.S. and M.S. in Applied Earth Science.

Started career in Bakersfield, working for Evans, Carey and Crozier.

Began working for Trio Petroleum in 1986.

Started working for Oxy in 1997. Worked in Oman from 1998 until 2002. Worked at Elk Hills from 2002 until now.

Currently, Chief Geologist at Elk Hills.

Bob Dockweiler Bio

Graduated from California Lutheran University in 1974 with a B.S. in Geology.

Began petroleum industry career with Cities Service Company in Tulsa in 1977. Joined OXY in 1980 and has held the positions of Geophysicist, Chief Geophysicist, and Senior Geophysical Advisor in Bakersfield, Peru, London, Ecuador, Pakistan, Oman, and Houston.

Currently, Sr. Geophysical Advisor at Vintage Production California in Bakersfield <