

The Belridge Giant Oil Field - 100 Years of History and a Look to the Future

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April 2011 marks the 100th anniversary of the well that discovered the Belridge giant oil field in the San Joaquin Valley of California. During the 100 years the field has produced 1.6 billion of the approximately 6 billion barrels of the estimated original oil in place. The field is 45 miles WNW of Bakersfield and covers an area roughly 22 miles long and 2.5 miles wide. It has three totally separate and distinctly different producing zones: shallow Pleistocene fluviodeltaic sands producing heavy oil via steamflood; Miocene deepwater diatomite layers producing light oil via hydraulic fractures and with water injection pressure maintenance; and deep Oligocene to lower Miocene marine sandstones producing gas and light oil via gas expansion. Each zone was developed and reached maximum production rate at different times and using different completion strategies. The produced oil is sold at the field and pipelined to refineries in northern and southern California for processing.

Although down from its peak of 175,000 BOE per day in 1986, the field currently produces 80,500 BOE per day which makes it one of the largest onshore fields in the USA. Since discovery, over 15,000 wells have been drilled although only 6,000 producers and 2,400 injectors are still active. In each of the past few years, about 600 new wells have been drilled and completed. Even though production is in decline, the field has significant remaining oil in place and remains a very attractive target for continued development of known resources as well as for exploration below current production and around the periphery of the field. In recent years 3D earth models coupled with an emphasis on optimizing the placement and retention of injected water and steam have helped improve recovery. Over 300 horizontal wells have been drilled in the fluviodeltaic sands and the diatomite.

In the 1930s the field had the deepest well drilled in North America. In the 1990s the field had the closest well spacing of any field in the world: vertical and horizontal wells drilled 37.5 ft apart and completed with sand-propped fracs. At the start of the 21st century the field is gearing up for many more years of activity with installation of a microseismic array, distributed temperature sensing in water injection wells, regular InSAR surveys, as well as ongoing interpretation of a 3D seismic survey covering the entire field for targets below the current producing zones.