

**Good to the Last Drop: Impact of 3-D Technology on Horizontal Well Placement, Midway Sunset Field, California**

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Thirty years of thermal recovery have resulted in a field with varying reservoir maturity that requires clear reservoir characterization. The understanding of the field depletion process and recognizing remaining development opportunities have been challenges at Midway-Sunset field, California. Integrated 3-D geologic models were essential to better define both remaining oil in place and hot-versus-cold oil-development opportunities, to facilitate placement of new horizontal wells development, and to estimate incremental oil reserves associated with the new development. Near realtime geosteering utilizing the 3-D models was employed to coordinate drilling activities, such as optimizing dogleg angle and determining mud cooler needs.

The data from over 20,000 wireline well logs were normalized for usage in the 3-D models. The models include COIP, Vapor, and multiple Temperature 3-D volumes. Reservoir details, such as steam chest location, water aquifers, and incremental oil zones, were then clearly identified for highly dipping stacked sands, leading to numerous downdip targets for horizontal well placement.

Items to be covered will include 3-D model usage for reservoir characterization, techniques for incremental oil identification, and best practices during the horizontalprogram drilling phase. Post-drilling evaluation is currently in progress and will be included in the discussion.