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RESERVOIR SEGMENTATION IN THE COMPLEXLY FOLDED, FAULTED, AND FRACTURED LOWER MIOCENE MONTEREY CHERT RESERVOIR AS EVIDENCED FROM FORMATION TEST (SCHLUMBERGER, MDT) AND PRODUCTION DATA: IMPLICATION FOR RESERVOIR DEPLETION AND DEVELOPMENT, SANTA YNEZ UNIT, OFFSHORE CALIFORNIA

Recent data from SYU drill wells suggest that vertical and lateral reservoir segmentation is prevalent in the Monterey fractured chert reservoir as a result of laterally continuous shales and transpressional fault systems. Average formation thickness is 1700 feet and is subdivided in three producing intervals. Shale units are prevalent throughout the section and have a significant influence on vertical fluid flow. Due to the physical properties of the Monterey, conventional logs are not able to resolve hydrocarbon contacts, porosity and water saturation, thus requiring the use of open hole formation testing and production data to resolve hydrocarbon contact locations and water movement.

Since 1998, seven Schlumberger Dual Packer MDT logs have been run at SYU. In all cases where multiple reservoir zones were tested, significant differences in pressure gradients were encountered, indicating vertical segmentation. Results from MDT fluid analysis and production data further supports segmentation. Faulting also plays an important role in reservoir segmentation. Production data indicates contact differences across transpressional fault systems. There is also evidence faults can breach vertical permeability barriers, and there are cases where fluids appear to have migrated along fault zones as a result of production.

The current challenge at SYU is understanding the interplay between end-member fluid movement behaviors. Vertical permeability barriers have resulted in bypassed oil accumulations and an increased understanding of segmentation has resulted in a change in depletion strategy designed to recover these reserves.