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Regional Patterns in Growth of United States Giant Oil Fields, 1945-1998: Influence of Reservoir Drive Mechanism and Recovery Technology

From 1945 to 1998, Oil and Gas Journal published annual tables reporting production and reserves for domestic oil fields. Digitally transcribed, graphically displayed, and supplemented by literature-derived development histories, this dataset is useful for examining the growth history of about 300 giant oil fields.

Fields in all regions grew by intensified development, new-pool discoveries, and pressure maintenance during the 1950's, as post-war economic expansion drove demand. In the 1960's to early 1970's, many fields registered abrupt jumps in estimated ultimate recovery (EUR) attributable to waterflooding. Since the 1970's, EUR's of most giant fields have remained flat, particularly in Gulf Coast and Mid-Continent reservoirs with water drives. Regions with significant growth include California, the Permian Basin, and Rocky Mountains, where growth resulted from applying technology to fields with inefficient solution gas drive, poor permeability, or heavy oil. Steamflooding heavy oil fields and fracturing diatomite reservoirs has driven growth in California; in the Permian and Rocky Mountain basins, growth has stemmed from waterflooding, infill drilling, and CO₂ flooding. Most high-growth fields in these regions have solution gas drives, not water drives.

Fields grow rapidly during delineation and early development, but subsequent growth depends on availability of appropriate recovery technology. Fields discovered in the early 1900's waited many decades for secondary- and tertiary-recovery-controlled growth spurts, but recently discovered fields have had modern recovery technology applied during early development, so they have grown less after delineation.

Comparison of EUR with oil-in-place volumes suggests that many fields have achieved efficiencies of 50-70% and are probably approaching their limits.