
ENVIRONMENT OF OIL AND GAS

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Four principal factors are involved in the environment of oil and gas. These are structural (geomorphic), sedimentary, biotic (biochemical) and climatic. Geomorphic highs or anomalies on the original crystalline basement control sedimentation. Coarse clastics deposited adjacent to, around or over them become indurated principally by cementation and compaction; hence a high average of competent deposits occur towards an anomaly and the deposits become increasingly more incompetent away from an anomaly. Thus these epicenters of competency become reinforced during each stage of sedimentation and, therefore, more pronounced as a result of each stage of diastrophism. They continue through geologic time and may occur as geomorphic anomalies on present day surfaces.

The total biotic environment has vertical and horizontal limits in time. A perimeter of low porosity delimits the hydrocarbon bearing sands and beyond this competent zone incompetent shales and/or porous sandstones occur. The porous sandstones of the "up" side will produce neither water nor oil and gas. In the opposite direction the limit of the hydrocarbon bearing sands may also be indurated or may grade into argillaceous deposits or porous incompetent water-bearing sandstone. The limits of this total biotic environment are measurable and predictable. For a map showing the probable distribution and thickness of permeable deposits that should contain gas and/or oil, the term *petropach* is suggested.

Local shifting of the total environment in time depends on (1) regional movement, (2) increase or decrease in velocity of transporting agents, (3) volume, sizes, shapes, specific gravity of sediments, (4) extraneous influences and materials, and (5) cyclic variations in climate.

Variation in width of structural terraces in oil or gas bearing sands is determined by competent-incompetent relationship of the sedimentary environment, and this relationship in folded strata favors the occurrence of gas and/or oil in asymmetrical rather than in symmetrical folds.

Environmental conditions favorable to the prolific occurrence of hydrocarbons suggest continental rather than marine environment and these conditions militate against long-range migration.