

## APPLICATIONS OF RESERVOIR GEOCHEMISTRY TO DEVELOPMENT AND PRODUCTION PROBLEMS

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### ABSTRACT

Developing an optimum strategy for reservoir development and production management is a multidisciplinary effort involving many different technologies. Reservoir geochemistry helps provide a better understanding of reservoir character and performance through the detailed analysis of the reservoir fluids. While bulk property analyses such as gravity and viscosity are useful for the general characterization of the fluids. It is the detailed molecular composition of the fluids which is the most important in reservoir geochemical studies. This includes analyses such as high resolution capillary gas chromatography, gas chromatography-mass spectrometry (biomarker analysis) and isotopic composition of individual hydrocarbon compounds. Examples of geochemistry applications include

1. Determining the lateral and vertical extent of hydrocarbon continuity.
2. Identifying the type of hydrocarbons present in the reservoir.
3. Allocating production to individual zones when production commingled.
4. Identifying the location of tubing string leaks and cross flow between zones.

Several immediate benefits result from these applications. First, because geochemical methods are inexpensive compared to other reservoir characterization and production monitoring techniques, geochemistry is cost effective and can lead to significant cost savings. Second, geochemistry provides independent support of interpretations from other common analyses such as pressure tests and wireline log analysis. Finally, geochemistry provides a direct measure of hydrocarbon continuity based on the fluids which will actually be produced. This latter point is especially important in structurally complex reservoirs where faults may be difficult to identify and when communication across known faults may be questionable. Several examples will be presented to illustrate the value of reservoir geochemistry studies.

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