Oil Generation Rate Prediction using Arrhenius Equation for Bakken Formation

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ABSTRACT

Oil generation rate index is important in considering oil well performance. An oil generation rate index was estimated for two groups of wells in Bakken Formation in the North Dakota portion of the Williston Basin. Activation energies consistent with a fixed frequency factor (1x10-14/sec) and estimates of the current temperature within the Bakken Formation were used to calculate a reaction rate. The reaction rate was converted into a generation rate index by multiplying the reaction rate by the mass of crackable kerogen derived from Rock-Eval S2 analyses and bulk density logs. The Rock-Eval pyrolysis temperature of 435°C, production index of 0.1 and conversion fraction of 0.1~0.15 are believed to represent the threshold of intense hydrocarbon generation from mature rocks. The calculated reaction rate index appears consistent with this threshold.