

Determination of In-situ Hydrocarbon Volumes in Liquid Rich Shale Plays

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Abstract

The determination of accurate in-situ oil and gas volumes is critical for unconventional “liquid-rich shale” (LRS) plays to determine total resource in-place and accurate recovery factors. In this presentation we present methodology using geochemistry applied to pristine core samples to determine in-situ oil volume per volume of rock (bbls/acft). This methodology uses open system Rock-Eval pyrolysis and solvent extract based geochemistry to determine the total hydrocarbon volume. An additional method is shown which attempts to correct for the mass of oil lost due to evaporation during core recovery. The oil lost during core recovery is mostly low boiling point hydrocarbons less than C15 in the diesel and gasoline range compounds. The loss of this material can be estimated by knowing the density of the hydrocarbon fluid in-place which can be estimated from the whole oil extract gas chromatogram or estimated from relationships based on biomarker compounds. Examples of the methodology are shown for oil and water based drilled cores to assist in lateral well placement for enhanced liquid yields.