

INTERPRETATION OF TOTAL ORGANIC CONTENT IN SHALE GAS RESERVOIRS FROM CONVENTIONAL WELL LOGS USING MULTI-LINEAR REGRESSION METHOD

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Abstract

South Sumatra Basin is a prolific basin in Western Indonesia. The stratigraphy ranges from Eocene-Recent and consists of various lithologies. Some shale intervals in this basin have been proven as a good source rock for several oil and gas fields in the vicinity. This also creates an opportunity for the development of shale gas exploration in the basin. The biggest challenge in the development of shale gas here is the lack of reference to shale gas fields that have been in production. The sub-surface information of many oil and gas fields is insufficient to develop shale gas exploration. Cost efficiency is also a big issue to exploration. In relation to shale gas reservoir, Prabumulih field only have very limited information of the sub-surface in terms of total organic content (TOC). In this research, seventeen core samples obtained at various depth were studied in laboratory to calculate the TOC. The aim of this work is to acquire the TOC data from mathematical relationship by using Multi-linear regression method. We estimated the TOC information as a function of depth by applying this method. Conventional well logs like gamma ray (GR), density (RHO), neutron porosity (NPHI), sonic (DT) and resistivity were utilized. In this method, we cross plotted various log curves like GR, resistivity, RHO, DT, NPHI and obtained a coefficient for each curve. The coefficient was further used to write function for calculated TOC. The TOC log modelling has been conducted with data limitations at certain depth points and calibrated with laboratory data analysis. The correlation between the TOC obtained from laboratory test, and the one calculated using Multi-linear regression obtained a similarity upto 92%, which proves that this method is easy, reliable and cost effective. Increasing the number of laboratory data samples increases the accuracy and reliability of this method.