

A Composite Analysis for Facies Interpretation and Hydrocarbon Identification Using an Advanced Gas Data: A Case Study in Mutiara Field, East Kalimantan, Indonesia

Sinaga, Iranta Bona¹, Robert Nikijuluw¹, Hamjaya Ilham² (1) VICO Indonesia, Jakarta, Indonesia (2) Geoservices, Balikpapan, Indonesia

The identification of reservoir formation fluids in the deltaic environment that is influenced by multi layer reservoirs, coal presence in every 100 ft, pressure, mud weight and mud type during drilling operation is often ambiguous. In matters of pay zone recognition, hydrocarbon-bearing reservoir as well as high or low-pressure formation need to be clearly detected. Knowing the composition of the formation fluid while drilling would be obviously one of the most useful data item.

An advanced gas detection system combined with new gas analysis and interpretation services from Geoservices called INFACT has been utilized and evaluated. The fully computerized gas detection system combines total gas and chromatographic measurements and has quicker cycling time for measuring in parts-per-million the concentration of alkane carbon molecules and molecular isomers. This advanced gas detection shows a continuous data stream with far more data points per interval and greater resolution due to a 42 seconds sampling time per complete chromatograph cycle. The method also allows us to evaluate and improve the understanding of reservoir in real time while drilling.

Process analysis and interpretation is started by evaluation of gas quantity based on Total Gas or Methane gas values by taking account the impact of ROP, Mud Weight. Base on this values, potential and interest zone are selected. Next process continued by compositional gas chromatograph analysis from selected zones by using cross plot analysis using N- Dimensional Logarithm.

The method has been applied successfully in Mutiara field, where deltaic environments of ancient Mahakam River tend to have a complexity in determining the hydrocarbon reservoirs. This method could also differentiate gas, oil and water zones, depleted zone, hydrocarbon water contact, and identify hydrocarbon zone with low gas reading.