Paper P36

Spatial-temporal variability of hydrocarbon distribution in the northern sector of the Belait Formation

SYAMIM RAMLI[1]*, PADMANABHAN E.[1], M.A. MOKHTAR[2] & WAN ISMAIL WAN YUSOFF[1]

[1] Geoscience & Petroleum Engineering Department,
Universiti Teknologi PETRONAS, 31750 Tronoh, Perak
[2] PETRONAS Carigali Sdn. Bhd., Level 16, Tower 2,
PETRONAS Twin Towers, KLCC, Kuala Lumpur
*Email Address: syamim_g01261@utp.edu.my

Spatial and temporal variability is the subject matter of interest in the Oil and Gas Industry. Recently, Padamanabhan (2010) indicated that the Belait Formation in North-eastern Sarawak showed tremendous spatial and temporal variability. By understanding this variability, improvements may be introduced to understanding reservoirs and its managements.

The Belait Formation in North-eastern Sarawak represents the Middle – Upper Miocene age in the Miri Zone tectonostratigraphic. The Formation comprises alternating sandstone, sand and clays in varying proportions and thickness (Liechti *et al*., 1960; Tate, 2001; Hutchison, 2005). Traditionally the Belait Formation has been accepted as barren. However it has been discovered recently that hydrocarbons can be present in various forms in the Formation. The purpose of this research is to investigate further the occurrence of hydrocarbon and to characterize this aromatic hydrocarbon in the northern sector of the Belait Formation in Sarawak. Four representative samples were selected from an outcrop that had a stratigraphic height of about 100m. These samples were subjected to range of mineralo-chemical analysis and petrographical analysis.

Fourier Transform Infrared spectra confir the presence of aromatics in addition to free radicals and carboxyl group. This findin is further supported by variations of E_4/E_6 ratios varying from 1.43 - 1.52. The x-ray fluorescenc spectrometry indicates a high amount of oxygen, silica and aluminum indicating the presence of minerals such as kaolinite and quartz. Subordinate amounts of iron can be attributed to the presence of hematite or goethite. Powder diffraction data confirm the presence of the above weathered minerals in addition to traces of mineral such as titanium. Surface area estimations revealed that the presence of aromatic hydrocarbons attribute to the substantial increase of surface area. It is concluded that there is a spatial and temporal variability of appreciable sense of the hydrocarbon distribution in the northern sector of the Belait Formation. The presences of the aromatics are probably terrestrial and indicative of kerogen type I to III. However, the ongoing study to confir the kerogen type is expected to be completed later this year.

Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 36, No. 2, April-June 2010