Session: 9 Location: Function Room Date: 10-10-2013 Time: 8.30 am - 8.50 am

Impact of bioturbation on reservoir quality: A case study of biogenically reduced permeabilities in reservoir sandstones of the Baram Delta, offshore Sarawak

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ABSTRACT - Baram Delta is one of seven geologic provinces in the Sarawak basin and is the most prolific. Bioturbation is an important source of reservoir heterogeneity and has an impact on porosity and permeability of reservoir sandstones. There is still a lack of knowledge on the impact of bioturbation on porosity-permeability characteristics of reservoir rocks in the Baram Delta therefore this study is aimed at evaluating the impact of bioturbation on porosity and permeability of reservoir rocks of the Baram Delta. Reservoir sandstones were analyzed using thin sections, spot permeability, scanning electron microscopy and energy dispersive x-ray. Sample, S1, from the studied core interval is dominated by Diplocraterion ichnofabric. S1 is highly to intensely bioturbated with bioturbation index between 60-99%. Spot permeability values range between 158-381mD in the host sediment and 33.8-176mD in the burrow and burrow lining respectively. This represents a permeability decrease of 78% between host sandstone and burrow. Sediment packing activity was observed in S1. Sediment packers incorporate iron oxides, clays and organic matter from the host sandstone into burrow fills and linings, thereby decreasing isotropy and sorting of the sediments resulting in a reduction of porosity and permeability locally in the burrow relative to the host sandstone.

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Facies and Architectural Element Analysis, Maturity and Mineralogical Characterization of The Balingian and Begrih Formation, Sarawak

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ABSTRACT - This paper reports an insight into the facies distribution, architectural elements, maturity and mineralogical characters. Seven facies associations are recognised, facilitating high resolution facies and sequence analysis including its depositional environment and highlighting the maturity and mineralogical characters. The Balingian's shale alternates with sandstone and coal and represents a complex of fluvial – deltaic - estuarine depositional environment. This succession grades upward into the pebbly sandstone and conglomerate of the Begrih Formation. The organic richness of the shale samples show good to excellent organic richness. The shale samples also show poor to very good hydrocarbon generating potential (vary from 0.36 to 11.52 mg HC/g rock). Hydrogen Index is less than 100 and this suggests that the shales contain mainly gas prone of Type III kerogen. Evaluation on thermal maturity shows that the samples are in immature as indicated by Vro values <0.8%, Tmax 408 – 419oC and Generation Index for <0.1. Visual organic matter typing show that shales contain mainly terrigenous derived organic matter, occasionally mixed with Dynocyst and Marine prasinophyte phycoma sp. Those confirm the depositional environment in brackish water setting under anoxic-oxic condition of lower delta to estuarine. The mineral composition is dominated by quartz and clay matrix as syngenetic minerals. Some clay minerals (i.e. kaolinite, illite, chlorite) also present during diagenetic mineralization and diminish the pore volume.