

Re-evaluation of the Petroleum Potential in Central Java Province, Indonesia: Innovative Approach Using Geochemical Inversion and Modeling

Subroto, Eddy A.¹, Handoyo E. Wahono², Eddy Hermanto², Dardji Noeradi¹, Yahdi Zaim¹ (1) Institute of Technology, Bandung (ITB), Bandung, Indonesia (2) Executive Agency for Upstream Oil and Gas Business Activities (BPMIGAS), Indonesia, Jakarta, Indonesia

The Central Java Province has two potential basins, i.e. South Central Java Basin and North Central Java Basin. Since early 20th century, oil and gas seeps have been reported from the two basins providing evidence for an active petroleum system in the region. However, up to present time, the origin of the Central Java oils has been enigmatic, as well as its geology and tectonics. Various source rocks have been suggested including Palaeogene and Neogene sediments, mainly based on the equivalence with those in the Northeast Java Basin.

A number of wells were drilled in the basins, but the wells penetrating the Palaeogene section are extremely sparse. During this study, basin modelling was carried out to obtain more information about the possible petroleum system. The model also gave information regarding the timing of hydrocarbon generation, possible migration pathways, and potential traps.

Several oil samples were analysed for their biomarkers. It was revealed that the oils could be classified into three families: the first was sourced by terrestrial facies, the second is from more marine environment, and the third indicates lacustrine environment. The isotope data support this classification. Characteristics of the oils were then used to infer source rock(s) identity in the region. Based on an integration of the data of crude oils and the geochemical model, the most probable source rock of the South Central Java Basin is the Pemali Formation whereas that of the North Central Java Basin is the Ngimbang Formation equivalent.