

## Seal Capacity Evaluation by Using Mercury Injection Capillary Pressure Method Integrated with Petrographic Data: A Case Study in Green Dragon Oilfield Offshore Vietnam

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**Abstract :** This study presents an integrated approach using Mercury Injection Capillary Pressure (MICP) and petrographic analysis to assess the seal quality of the inter-bedded shale formations which are considered the intra-formation top seals of hydrocarbon bearing zones in Green Dragon structure. Based on the hydrocarbon column height (HCH) at leak point derived from capillary pressure data, four seal types were identified. Furthermore, the results of scanning electron microscopy (SEM) and X-ray diffraction (XRD) analysis were interpreted to clarify the influence of clay minerals on seal capacity. The result of the study indicated that the inter-bedded shale formations are the good sealing quality with a majority of analyzed samples ranked type A and B seals in the sample set. Both seal types occurred mainly in mudstones with pore radius estimated less than 0.251  $\mu\text{m}$ . Overall, type A and B seals contained a large amount of authigenic clay minerals such as illite, chlorite which showed the complexity of morphological arrangement in pore space. Conversely, the least common seal type C and D were presented in moderately compacted sandstones with more open pore radius. It is noticeable that there was a reduction of illite and chlorite in clay mineral fraction of these seal type. It is expected that the integrated analysis approach using Mercury Injection Capillary Pressure and petrographic data employed in this study can be applied to assess the sealing quality of future well sites in Green Dragon or other structures.

**Keywords :** seal capacity, hydrocarbon height column, seal type, SEM, XRD

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