Oil and gas exploration in Malay Basin started by ESSO and CONOCO in early 1970’s targeting on the clastic play.

CONOCO focused the exploration for clastic play over southern Malay Basin Concession area. Many discoveries were made after drilling several exploration wells. In Anding, the discovery wells tested oil in clastic Group K and L reservoir sands and the wells were TD’ed in the basement.

In 1978, CONOCO relinquished it acreage and the exploration effort continued by PETRONAS Carigali Sdn Bhd (PCSB) with oil and gas discoveries were made in clastic play. By 2004, with the initiative of Southern Malay Basin Exploration Team, PCSB drilled a new structure to the north of Anding field and discovered oil. The new oil discovery was the first fractured basement discovery in Malaysian Basin (Figure 1).

A total of six (6) exploration/appraisal wells were drilled with the main objective is fractured basement in Anding area. Based on the well results, the optimum well trajectory was established for exploring in fractured basement play over southern Malay Basin (Figure 2).

Surface outcrop study also was carried out at Redang island and surrounding areas (ca. 200km NW of Anding) to firm up the fractures trend and surface analogue for exploration drilling in fractured basement. A consistent shear fractures trends demonstrated by FMI data from Anding wells was observed on the surface outcrops. The existing of surface fractured basement at Redang Island is a good analogue for indeth studies of fracture distribution and its connectivity within basement reservoir. With the comprehensive study on the fracture distribution and connectivity within fractured basement play, optimum well trajectory to be planned in future for exploration and production management of the hydrocarbon resource in Malay Basin (Figure 3).

Based on existing wells drilled into the basement in Anding area, new hydrocarbon trap model was introduced. The hydrocarbon accumulation potentially trap in clastic sandstone overlying the basement and in fractured basement as a single fluid system to be existed in Anding field.

Integrated fracture study for Anding basement is recommended in order to have a comprehensive and integrated analysis of the distribution and effectiveness of fractures in Anding field prior to early monetization of hydrocarbon resources in Group L and fractured basement reservoirs.
Figure 2. Well trajectory analysis based on FMI data and test results from the wells drilled in the fractured basement within Anding area. Optimum well trajectory should be parallel to major faults in strike-slip fault system. Wells B and D was deviated in NW-SE direction and intersected with NE-SW open fractures (proved by significant flow rates). Wells A and C was deviated in NE-SW direction and intersected with NW-SE closed fractures and very limited NE-SW open fractures (low flow rates).
Figure 3. Fracture distribution and connectivity observed on the metasediment and granite rocks in Redang island and surrounding area. Top-left photo is metasediment rock along the beach in Northern part of Peninsular Malaysia, ca. 50km west of Redang island. Most open fractures trending NNE-SSW and ENE-WSW which same trend with Principle Stress in Malay Basin (general trend is NE-SW). Fractured density observed 1-2 fractures/m. NW-SE fractures trend most likely closed (clearly shown in bottom –left photo).