

CHAPTER VI

CONCLUSION

The Hua Hin basin is located in the Upper Gulf of Thailand between latitudes $12^{\circ}00'$ N to $13^{\circ}18'$ N and longitudes $100^{\circ}00'$ E to $101^{\circ}00'$ E. The basin is elongated in the N-S direction covering the area about 900 square kilometres. The average depth of the sea floor in the area of the Hua Hin basin and adjacent area is approximately 15 metres. The maximum thickness of Cenozoic sediments accumulated in the basin is approximately 5 kilometres.

The purpose of this study is to define the geological setting, geological structures, sedimentary sequence, sedimentary facies and stratigraphic framework of Cenozoic sediments in the Upper Gulf of Thailand with special reference to the Hua Hin basin.

The pre-Tertiary basinal basement rocks are believed to be the Permian limestone, clastic sediments of Permo-Carboniferous and undifferentiated Mesozoic clastic sediments. The pre-Tertiary basinal basement rocks are unconformably overlain by the younger sedimentary sequence of Cenozoic age. The Hua Hin basin is concluded to be initial development during Oligocene by the result of the interaction of major fault zones and plate motions in the region from Late Cretaceous to Early Tertiary.

The Hua Hin basin is considered to be an associated transcurrent faults or rift/transensional basin models according to the classifications of Miall (1984), Baillie (1987) and Ingersoll

(1988).

The oldest sediments in the Hua Hin basin is believed to be Late Eocene to Oligocene age and the Cenozoic sedimentary sequence in the basin is mostly non-marine clastics with the maximum thickness of approximately 5-6 kilometres in the deepest part of the basin. This Cenozoic sequence can generally be subdivided into 4 units, namely, Units A, B, C, and D in ascending order. The lowermost unit is the unit A represented by the lacustrine facies with the maximum thickness of approximately 2,800 metres overlying unconformably the pre-Tertiary basement rocks. Lithologically, this unit is mainly darkish grey shale interbedded with limestone. The Unit B overlies unconformably on the Unit A. The lacustrine facies in the lower part of the unit B has gradually changed into the fluvio-lacustrine facies in the upper part. The maximum thickness of this unit is range of 1,200 to 1,500 metres. The unit C overlies unconformably the unit B and is characterized by the fine- to medium- grained clastic sediment of fluvial origin. The uppermost succession is the unit D which is characterized by the medium- to coarse- grained clastic sediments of shallow marine origin. Generally, the geometry of units A and B also shows the westward thickening in the basin whereas units C and D are rather uniform and widely distributed throughout the study area.

In the Upper Gulf of Thailand, the basins were initially developed during Oligocene time and the lacustrine facies was predominant in the deepest part of these basins. The Early Miocene Unconformity is the result of the uplifting and erosion of sediments in these basins. This development is believed to be related to the

tectonic activities, especially the reactivation of existing major faults in this area and the sea-floor spreading in this region. Between Early to Late Miocene times, there was the fluvio-lacustrine sedimentation in the basins while the fluvial sedimentation was predominant in the basement-high areas. In the Late Miocene, there was the major changes in tectonic setting of this area which caused the cease of the listric normal faulting followed by the regional break of depositional. This is represented by the Late Miocene Unconformity. The sedimentation of clastic sediments of fluvial facies origin was continued after the break of deposition. During the Holocene time, sedimentation throughout the Upper Gulf has been under the influence of shallow marine environment up to the present time.

The stratigraphic framework of the Upper Gulf has been established. The lithostratigraphic units had been proposed as informal name in this study and compose of the Hua Hin Group and the Choa Phraya Group in ascending order. The Hua Hin Group comprises of 2 formations, namely, Nong Kae Formation and Phetchaburi Formation in ascending order. The Choa Phraya Group is represented by 2 formations, namely, Krabang Formation and Sattakut Formation in ascending order. The Nong Kae Formation is the lowermost lithostratigraphic unit which overlies pre-Tertiary basement in the basins of the Upper Gulf. This formation is only present in the deepest part of basin and is represented by the darkish grey shale with limestone of lacustrine facies. Phetchaburi Formation overlies unconformably the Nong-Kae Formation in the basins and overlies pre-Tertiary basement rocks in the basement-high areas. This Formation is characterized by the fluvio-lacustrine /fluvial facies. This

Formation can be subdivided into the P-1 Member, P-2 Member and P-3 Member in ascending order. The P-1 Member is fluvio-lacustrine facies which overlies the Nong -Kae Formation. The P-2 Member overlies conformable the P-1 Member and is represented by the fluvio-lacustrine facies. The P-3 Member is only distributed in the basement-high area as the lateral facies change of the P-2 Member and overlies unconformably the pre-Tertiary basement rocks. This Member is represented by the clastic sediment of fluvialtile environment. The Krabang Formation is the fluvialtile facies overlying unconformably the Phetchaburi Formation and is distributed throughout the area. The Sattakut Formation is the uppermost lithostratigraphic unit of the Choa Phraya Group. This Formation overlies the Krabang Formation with discernible and is disconformity represented by shallow marine facies.

Up to present, there is no commercial hydrocarbon found in the Hua Hin basin. The seismic data confirm the presence of the maximum sedimentary sequence over 5 kilometres in thicknesses. The geological data, such as, total organic carbon (TOC), source rock maturation and geothermal gradient, obtained from Phetchaburi-1 well suggest that the hydrocarbon may be generated in the basin. The petroleum is possibly accumulated in the stratigraphic and /or structure traps of the Phetchaburi and Krabang Formations. Although no commercial hydrocarbon found is in the study area but the information from this study and the understanding of the basin can serve to bridge the missing link between the geological configurations of the Central Plain and the Gulf of Thailand.