

Lithostratigraphy of Mae Sot Formation, Fang Basin, Changwat Chaing Mai

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Abstract

The Fang basin is a Cenozoic fault-bounded intermontane basin, located in Amphoe Fang, Chang Mai province, northern Thailand. This area has been surveyed, explored for hydrocarbons and production started by Northern Petroleum Development Center. The purpose of this project is to study the lithostratigraphy of Mae Sot Formation, Fang basin, by using cuttings and wire-line log data. Lithostratigraphic study of Mae Sot Formation will lead to a better understanding of its deposition environment. This will in turn help in petroleum exploration and production in Fang basin and other similar Tertiary basins in Thailand.

Keyword: Lithostratigraphy, Fang Basin, Mae Sot Formation, Depositional environment.

1. Introduction

Most Tertiary basins in Northern Thailand are intermontane basins that are generally small and narrow, but relatively deep and high in heat flow. Believed to form in a series of pull-apart basins, these basins are located in N-S trending half-graben. Oil seeps were found over a century ago in Fang Basin in the North. Fang Basin located in Amphoe Fang, Chiang Mai province, northern Thailand (Fig.1). The basin is crescent shaped with the convex side pointing to the northwest direction and the longitudinal axis oriented in the north-northeast-south-southwest direction. Fang basin can be divided into two formations, namely Mae Fang Formation and Mae Sot Formation of which the latter has great potential for petroleum.

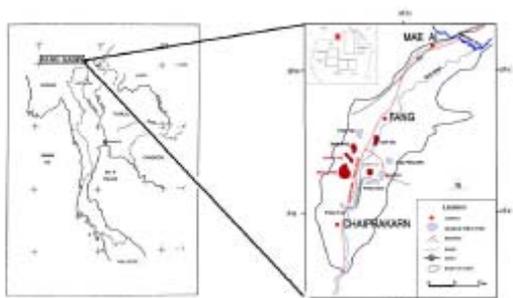


Figure 1: Index map showing the petroleum exploration and production area of the Fang basin, northern Thailand.

This project studied the lithostratigraphy and depositional environment of Mae Sot Formation using cutting samples from drill-holes FA-BT-44-04 and FA-PK-50-03 and by using wireline log (drillon wireline log data (drill-hole FA-BT-44-04, Ban Thi Oil Field, drill-hole FA-PK-50-01, FAPK- 50-02 and FA-PK-50-03, Pongsaikham Oil Field)



Figure 2: Map showing the well location of Ban Thi Oil Field and Pongsaikham Oil Field, Fang Basin.

2. Experimental Results and Discussion

From studying cutting samples and wire-line log from Ban Thi Oil Field and drill-holes from Pongsaikham Oil Field as detailed earlier. They can be divided into five units. Unit A is composed of mainly reddish brown claystone intercalated with thin sandstone layer. The sandstone is medium- to very coarse-grained, poorly sorted, subangular to angular with low sphericity. A gamma ray log of this unit shows bell shape. The depositional environment is thought to be fluvial. The thickness of this unit ranges from 500 to 700 feet. Unit B comprises of predominantly medium gray claystone and a thick coal seam, which is approximately 70-100 feet thick. The sandstone is medium- to very coarse-grained, poorly sorted, subangular to angular with low sphericity. This unit has high gamma ray trend. The depositional environment is thought to be lacustrine. A thickness of this unit is between 350 and 500 feet. Unit C is composed of predominantly medium gray claystone intercalated with few sandstone layers. The sandstone is medium- to very coarse-grained, poorly sorted, subangular to angular with low sphericity. The unit has high gamma ray trend with series of a bell shape patterns. This unit is interpreted to be deposited in fluviolacustrine environment. The thickness of this unit is between 700 and 1200 feet. Unit D is composed of mainly medium gray claystone. However, claystone of this unit from well in the Ban Thi Oil Field (north of Pongsaikham Oil Field) has thin sandstone layers intercalated. The sandstone is medium- to very coarse-grained, poorly sorted, subangular to angular with low sphericity. This unit has the high gamma ray trend and occasionally has a funnel shape. The depositional environment is thought to be lacustrine with increase in sediment influx in the northerneast (Do you mean northeastern?) of the study area. A thickness of this unit is between 1250 and 1700 feet. Unit E, which is interpreted based only on wireline logs data due to lack of cutting samples, has funnel-shape of the gamma ray log. This unit is

interpreted to be deposited in delta environment. The thickness of this unit is between 670 and 750 feet.

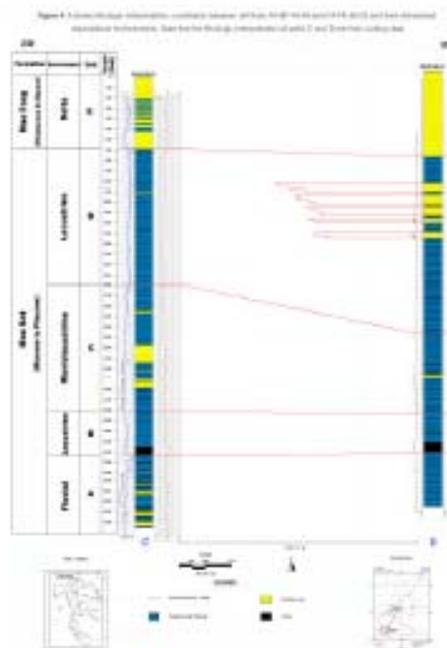


Figure 1.3: Lithostratigraphy and well-log correlation of drill hole FA-BT-44-04 and FA-PK-50-03 and their interpreted depositional environments. Note that the litholog interpretation of wells C and D are from well-cuttings data.

3. Conclusion

The study of Ban Thi Oil Field and Pongsaikham Oil Field from well-cuttings and wireline logs indicate that they can be divided into five units. The unit A is has claystone intercalated with a thin sandstone layer, and is interpreted to be from a fluvial environment. The unit B has predominant claystone and a thick coal seam with wireline logs data showing no internal change in the claystone unit but showing high resistivity and low gamma in the coal seam layer. The lithological succession of this unit is interpreted to indicate a lacustrine environment. The unit C with dominantly claystone intercalated with few sandstone layers, is interpreted to be fluviolacustrine. The unit D has dominant claystone, and interpreted to be lacustrine. The unit E is interpreted to be delta depositional environment.

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