INFORMATION OF THE DISSERTATION (1 A4 PAGE)

Thesis' title*:* CHARACTERICSTIC OF OIL AND GAS PROPERTIES DISTRIBUTION BASE ON PVT AND GEOCHEMICAL DATA IN CULONG BASIN

Specialty: PETROLEUM ENGINEERING

Code: 62520604.

PhD candidate: NGUYEN MANH HUNG

Supervisor: 1. ASSOCIATE. PROF. DR HOANG DINH TIEN.

2. ASSOCIATE. PROF. DR NGUYEN VIET KY

Institution: UNIVERSITY OF TECHNOLOGY HO CHI MINH CITY

MAIN RESULTS OF THE DISSERTATION

The study shows the close relationship between reservoir oil properties and geochemical data (in oil and source rock). Overview all availabe data (PVT and geochemical data) revealed a clear picture of oil and gas properties distribution in Cuu Long basin. Oil and gas distribution rules are proved by analysis data : biomarker, chemial residual, organic mater, geology data and physical properties of reservoir hydrocarbon. Distribution rules are conluded based on clear explanation with many supporting scientific evidences, high realibility.

Many previous studies on source rock have been carried out and most of data are old and inconsistence in Lower Oligocene + Eocene? (E + F sequence) interval. Previous studies did not provide data in detailed according to block, stratigraphy and sequences, therefore their evaluations are very generalized. This study updated many new data in new area and divided into blocks, stratigraphy, sequences based on the latest unified stratigraphy (2013). In addition, to enhance evaluation hydrocarbon potential generated by source rock, the original TOC was restored from measured TOC data. Therefore, there are some main differerences with previous studies such as Oligocene Lower+ Eocence? (E+F sequence) is richer organic mater than Upper Oligocene (D sequence) and hydrocarbon were generated mainly from the Lower Oligocene+ Eocene source rock and a bottom part of Upper Oligocene (D sequence) at deep depression. For Lower Miocene source rock, the orignal organic mater was mainly in the Kerogene type III in South and Center of basin. North and NorthEast of Cuu Long basin, Lower Miocene rocks are mainly Kerogene of type II. However, in the Lower Miocene source rock was not matured.

The relationship between the reservoir oil properties and geochemical data has been reported by some previous studies. The difference in this study is to highlight the differences in oil characteristics for each stratigraphy. Based on this relationship, the distribution characteristics of oil in the Cuu Long Basin are divided into two different oil-containing complexes: Basement and Lower Oligocene+ Eocene; Upper Oligocene and Lower Miocene. In addtion, the relationship between the Heptane index and the Iso Heptane index in the light fraction of the oil is also mention in this study. It is able to determine the initial type of organic mater as well as the thermal maturity that the oil in Cuu Long basin.

Based on map of thickness and depth distribution of each stratigraphic units in Cuu Long basin, distribution maps of the oil characteristics are drawed accordingly to each main properties in reservoir condition. Based on the combination of the oil characteristics, the corresponding source rock and the

distribution of the sand /clay ratio of each stratigraphic units, the hydrocarbon distribution is divided into central zone, transition zone and margin zone. The central zone is always associated with great hydrocarbon potential, high generated hydrocarbon area, bearing good seal rock and large storage capacity. Transitional zones show potential hydrocarbon, but the ability to generate and seal has been greatly reduced. With margin areas, low hydrocarbon potential due to very poor seal against the infiltration of the reservoir water as well as surface water.

NOVEL CONTRIBUTIONS OF THE RESEARCH

1. Determine in detail three source rocks into block and each stratigraphic unit on the new unified stratigraphic in 2013, restoring the original TOC value in order to understand the hydrocarbon generated potential.
2. Distribution laws of hydrocarbon in Cuu Long Basin mainly follows the distribution rules, some places occur inverted distribution (redistribution HC) due to poor shield or destroyed by the fault
3. Based on the reservour oil properties distribution maps for each stratigraphic unit, it can be divided into three different oil and gas potential zones: the central zone, the transition zone and the margin zone. All structures / non-structures in the central area and structures in the direction of oil migration mainly SE-NW are the areas with the highest oil and gas potential.
4. Study on the pair of Pr / nC17 and Ph / nC18 in comparison with source rocks and their relations indicated the main generated source rocks of Cuu basin Long. The evaluation results show that the Lower Oligocene + Eocene? (E + F) is the main generated source rock, whereas source rock from Upper Oligocene (D sequence) only contributes to small portion (only in deep depression).

ABILITY TO APPLY IN PRACTICE

- The pair of Pr / nC17 and PhCnC18 indicated in source rock and in the oil reflect the unequal distribution of kerogen and oil in the lower Miocene and Oligocene stratigraphy, but the pair in oil in all stratigraphy are most similar to kerogen in the Lower Oligocene + Eocene source rock.
- The oil distribution characteristics reflect the potential of each sedimentary formation and matching with geological modeling to improve accuracy of dynamic model.

FURTHER RESEARCH

It is necessary to build heat flow model for Cuulong basin to improve the accuracy of geochemical model 2D and 3D in Petromod, predict oil and gas migration parth and its potential. In particular, to reflect the generated hydrocarbon zones in accordance with the heat regime and the spatial distribution of source rock.