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The reservoir characteristics of Da'an oilfield

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Abstract: -Da'an oilfield is located in the Hong Gang terrace in SongLiao Basin. This paper, on the basis of results studied by predecessors, analysis the types of reservoir rock, Petrology characteristics such as reservoir physical properties and microstructure by the core observation, System sampling combined with focus on sampling and technical means such as microscopic analysis and chemical analysis. This paper aims on providing theoretical basis for Reservoir oil-bearing property evaluation and elaborate reservoir description.

Keywords: - *lithofacies: Physical properties ; sandstone reservoir*

I. INTRODUCTION

On the basis of results studied by predecessors, analyzing the types of reservoir rock, Petrology characteristics such as reservoir physical properties and microstructure by the core observation, System sampling combined with focus on sampling and technical means such as microscopic analysis and chemical analysis. Specific research contents include:

① Petrology basic characteristics, such as lithology, structure, structure, composition, matrix, cement and special contents

② Special component characteristics, such as Sensitive mineral, brittle minerals, plasticity, soluble mineral, clay mineral and other special mineral

③ Basic types of reservoir,such as Lithologic types, property type, type of components, and other types

II. THE GENERAL SITUATION IN THE STUDY AREA

Da'an oilfield is located in the Hong Gang terrace in SongLiao Basin， which situates in the transitional zone of central depression.It belongs to the terrace extrusion structure oil-gas accumulation zone. Because of the south east force of extrusion in The late Ming, the basal syngenetic-fault reverse thrust, formed the top long axis anticline structural trap and Da'an thrust fault.

There are three-section strata of Quantou Formation mainly when drilling in Da'an area. The cretaceous strata are fully developed, it developed Quantou Formation , Ostracod , Yaojia Formation , Nenjiang Formation, Sifangtai and MingShui formation from bottom to up.

III. PETROLOGY BASIC CHARACTERISTICS

3.1 petrographic composition

According to the results of core observation and section identification, the reservoirs of Fuyu group in Da'an oil field are feldspar debris sandstone. The quartz component is general 20～30%, 28.2% average; average content of feldspar is 36.8%. The lithic fragment Account for about 33～38%, 36% average. The petrographic composition of the research area has higher lithic fragment and feldspar than region, and lower quartz content than region. It has the characteristic of low compositional maturity which establishes a matter basis of formation the tight reservoir.

3.2 Filler characteristic

The matrix in the study area is mainly composed of clay minerals, and cement is given priority to carbonates and silica. Locally, there is the phenomenon that the argillaceous and calcium are on the high side.

Clay minerals are mainly illite, chlorite and the slip mixed layer. In different depth, the content of clay mineral is different. During 1700 ~ 1800m depth, the three ratio is almost. But in the 2200 ~ 2300m depth of Fuyang oil layer, illite accounts for the amount of about 67.4% of clay mineral, Chlorite accounts for about 1%, the illite smectite mixed layer accounts for about 31.6%.(Fig.1). From scanning the electron microscopy, Clay minerals exist in Grain table and intergranular pore by bypass type and diaphragm type servomotor generally.

Besides, the overgrowth quartz is commonly, and the cementation type is given priority to regeneration pore type.

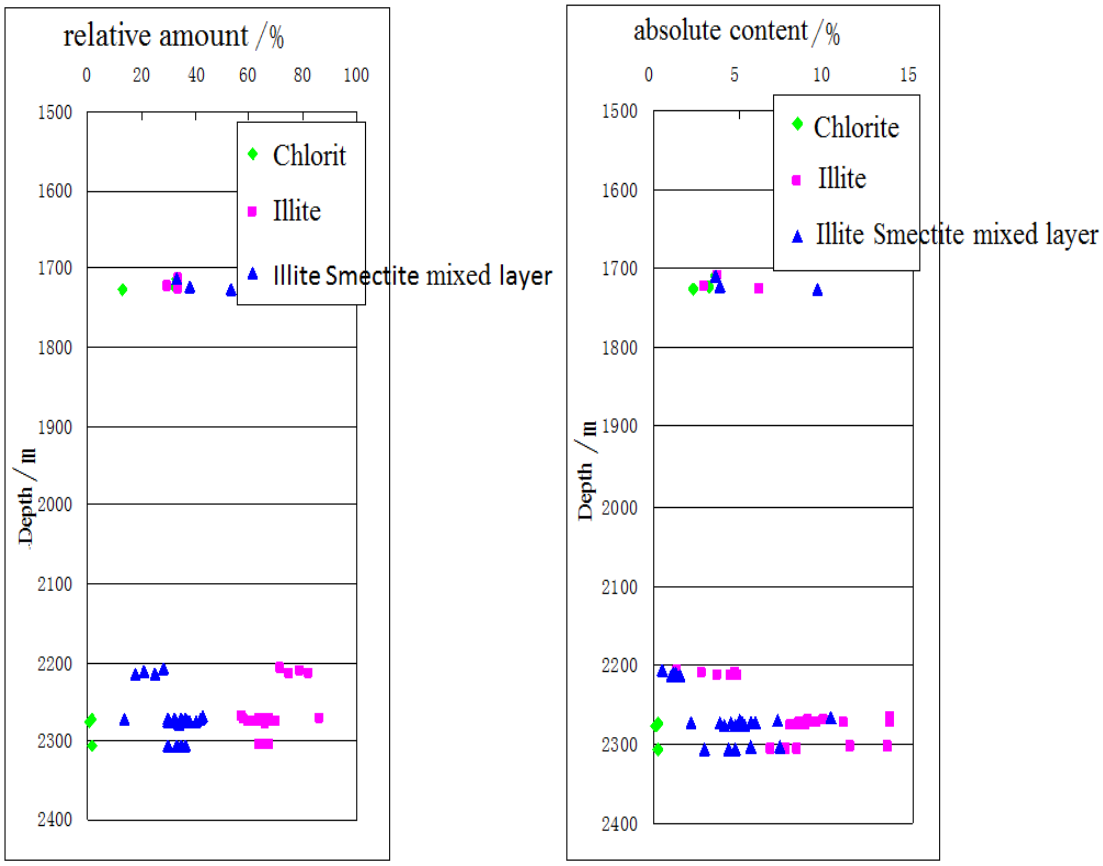

Fig.1 Clay mineral distribution

3.3 rock structure characteristics

According to the statistical results, the particle size of research area distributes between 0.04mm and 0.16mm mainly, and is given priority to fine siltstone. Also different particle size of microfacies sandbodies distributes different. Distributary channel and estuary dam have the thickest granularity which the fine sand ratio is predominated. The second is the dam point and sand sheet, which is given priority to very fine sand and fine silt. Particle contact relationship is given priority to point - line contact, and a little amount of point contact.

IV. LITHOFACIES CHARACTERISTICS

On the basis of predecessors' research work, observe and analysis the lithofacies of 8 coring wells (D 19-3, D 20-3, D 20-1, H 88, D 42-1, H 75-9-1, D 19-3, DB 10-012) in working area. There are eight major lithofacies types are Sm, Sh, Fs, Sd, Fr, Fh, Mr and Mg.

Sm: Mainly for shallow gray, celadon fine sandstone. Thickness stratum. Local oil. Abrupt contact in bottom. Transit to parallel bedding fine sandstone facies upward, form a slightly thinner upward positive rhythm cycle. It reflects the strong hydrodynamic conditions of rapid accumulation.

Sh: Mainly for the light gray, gray fine-grained sandstone, thickness stratum, sorting better. The thickness of lamina is between 0.2 cm and 0.5 cm. Consist of the parallel straight texture or intermittent.

Fs: Mainly for the light gray, gray, beige fine sandstone, thickness stratum, sorting better. Consists of a series of laminas that oblique in the formation interface.

Sd: Mainly for the light gray, gray of argillaceous siltstone. Reflect that under the action of gravity, the shape change of surface sediment

Fr: Mainly for the light gray, gray of argillaceous siltstone. Formation interface emerge gyrose shape. Lamina surface is irregular, the carbonaceous stripe is shown in lay. Mainly formed in the weak hydrodynamic environment.

Fh: Mainly for the light gray powder sandstone and argillaceous siltstone. Reflect the material under the condition is short for supply, and is mainly composed of suspended matter which formed slowly for vertical accretion.

Mr: Mainly for the maroon mudstone, massive bedding. And are the deposits for the weak hydrodynamic conditions oxidation environment.

Mg: Mainly for the grey, dark grey mud shale, massive bedding, contain pyrite particles.

V. PETROPHYSICAL CHARACTERISTICS

According to the SY/T 6285-1997 classification standard of permeability. The study area permeability distributed in low permeability - density level. Porosity distributed in low - ultralow level. Thus the study area is under the poor reservoir petrophysical. According to the further statistical analysis, the particle size of reservoir rock has a certain control function to the physical properties. The low - ultralow density pore reservoir rock is given priority to argillaceous siltstone.

VI. BASIC TYPES OF RESERVOIR

From the composition, the study area reservoir rocks are feldspathic lithic sandstone and lithic feldspar sandstone(Fig.2). From the granularity, purpose layer in the study area is given priority to fine sandstone (36%), siltstone (32%), and some for the argillaceous siltstone (18%) also the sandstone (14%). From the physical properties, the reservoir mainly belong to low - ultra low porosity (78.69%), ultra-low permeability - dense reservoir (96%)

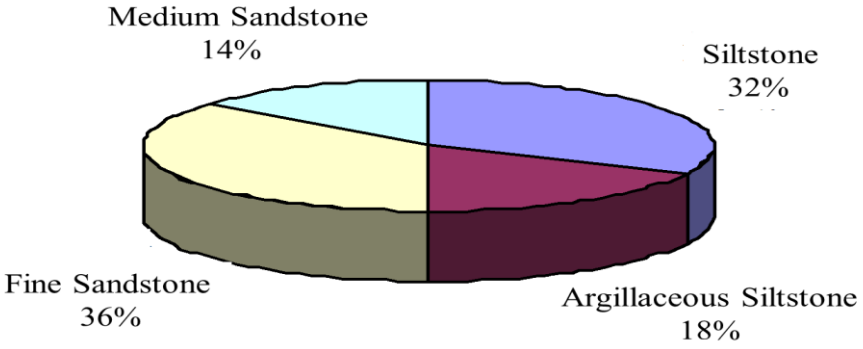

Fig.2 Lithology distribution pie chart

VII. CONCLUSION

1、Fuyu layer in Da'an oilfield is typical fine, silty sand rock, low permeability tight reservoir, microscopic pore structure of reservoir has a critical impact on the reservoir's physical property and oil content.

2 The general characteristics of reservoir property in the study area are Poor reservoir property and mainly for the special low hole - ultra low porosity, low permeability tight reservoir.

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