Depositional Characteristics of Neritic Transitional Delta and Their Influence on Reservoir's Properties in The 3rd Member of Lingshui Formation in Ya13-1 Gas Filed, China

YU Xinghe[1], LI Shengli[1], JIANG Ping[2], JIN Jianli[1], LI Mao[2], LI Maowen[2]

1. China University of Geosciences, Beijing 100083, China

2. Zhanjiang Division of CNOOC Ltd, Zhanjiang 524057,China

Abstract

Neritic transitional delta is dominated by river, tide and wave altogether, which is completely different from the terrestrial lacustrine basin delta. The difference of deltaic type and sandbody distribution are usually caused by strength of those three forces in the different stratum units, which further resulted in the difference of reservoir heterogeneity. It directly influences the development effect of oil & gas field. Since the discovery of Ya13-1 gas field, the type of depositional facies in the 3rd member of Linshui Formation has been always the controversial issues among the different researchers, especially its direction of sediments, dominant factor of sedimentation and etc. It restricts the understanding of sand body extension in spatial. The direction of sediments and types of depositional facies have been systematically investigated and synthetically studied that depends on specific description of cores about 1100m and the analysis of lithofacies. Eight lithofacies assemblages and two vertical sedimentary sequences of deltaic front have been established respectively. Then based on the correlation of sequence stratigraphy, the boundary of vertical flow unit of gas reservoir was divided by stable flooding surface, which clearly indicated the difference of flow unit in south and north of this study area that influenced by flooding surface. It has been proposed that the type of depositional facies in the 3rd member of Linshui Formation is belong to braided delta together dominated by river and tide, the direction of sediments is as long axis in northwest. These two processes of river and tide had obvious differences in different sedimentary period, so that two different models of depositional facies in upper and lower of the 3rd member of Linshui Formation have been is established respectively. The lower part was mainly dominated by river, the reservoir sand of deltaic front is characterized by lingual mouth bar, but the upper was mainly dominated by tide, the reservoir sand of deltaic front is typical finger mouth bar. Mouth bar and subaqueous distributary channel of deltaic inner-front are the chief reservoir sand in braided delta of the 3rd member of Linshui Formation. This is why differences of sedimentary characteristics and influence by wave and tide, which resulted in difference of reservoir properties between south and north of studied area.

Key words

Braided delta dominated by river and tide together, Lithofacies assemblages, flow unit, Lingual mouth bar and finger mouth bar, Reservoir property.