

Sealing Gas Zone And Its Controlling To Gas Distribution In Nanpu Depression

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Abstract: To study gas accumulation in Nanpu depression, based on the anatomy of caprock and the development and distribution of transport faults, sealing gas zone and its controlling to gas distribution in Nanpu depression were studied by the research method analyzing the relation between distance of caprock faulted thickness and gas distribution, it is considered that in Nanpu depression Es_2 、 Es_3 、 Es_1 、 Ed_3 、 Ed_2 and Ng_3 fractures of fault don't connected or sealing gas. Thus resulting that sealing gas zone of mudstone caprock is relatively large in Es_2 、 Es_3 and Ed_2 , the second is volcanic caprock in Ng_3 and the least is mudstone caprock in Es_1 .

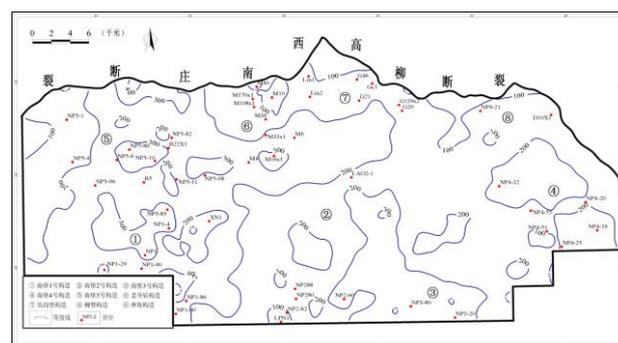
Key words: caprock; *faulted thickness*; *sealing gas limit*;

Nanpu Sag is a Cenozoic Bohai Bay Basin in the north rift, on the whole have broken the North South super graben fault feature recessed area 1932 Km², of which land area of 832Km², beach sea area 1100Km². The Depression-oriented development from the lower strata of Paleogene Shahejie Formation, Dongying, Neogene Guantao, Minghuazhen and Quaternary. So far, Nanpu Sag existing wells to see the display of natural gas, natural gas from the underlying bedrock the overlying Minghuazhen Jie distribution, and to the relatively shallow majority. However, Nanpu Sag number of different configurations shallow gas distribution is significantly different, which in addition to each configuration distance from the gas source, gas source fault, whether the reservoir and trap development and other factors, but largely by the accumulation of the caprock or not the impact of the caprock, natural gas can not migrate upward through the cap, can only be distributed in its next gathering; the contrary, the cap is not closed, the gas will pass through the cap upward migration, both can gather distributed thereon, and can be aggregated distribution under which, the correct understanding of this issue is the key to the Nanpu Sag in shallow gas exploration. While the former had Nanpu Sag in shallow cap its control on hydrocarbon distribution and discussion of the research was done, but these studies are mainly from the development of cap and break the current extent of the damage to the caprock characteristics of oil and gas capacity Research ^{[1] - [5]} of the caprock of oil and gas accumulation characteristics of relatively small capacity, there is only a study of the caprock of oil capacity characteristics of ^{[6] - [9]}, while the cap Research on characteristics closed almost nothing. Furthermore, the characteristics of the caprock of oil capacity is only limited to some areas and construction, lack of research the whole range of the recess, which is certainly not conducive to the Nanpu Sag gas exploration in shallow depth. Therefore, to Nanpu Sag in shallow accumulation of the caprock and its control function of reservoir area, for which the correct understanding of the distribution of shallow gas and gas exploration and guidance were a great significance.

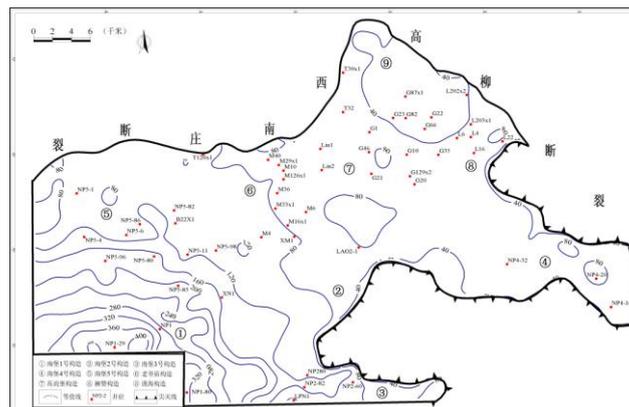
The results showed that natural gas drilling, Nanpu Sag in shallow gas cap is mainly mudstone and Hall East Sec three sections of volcanic cap. East Sec mudstone caprock distribution throughout the Depression, the maximum thickness of up to 300m or more, but restricted distribution, mainly in the western sag, thereby decreasing the recessed edge East Sec mudstone caprock thickness in recessed edge

small 100m . 1a, Nanpu Sag Hall Volcanic cap in the east and southeast of Sag missing, the maximum thickness of up to 400m or more, mainly in the southwest of the recess, thereby decreasing northeast Museum Volcanic cap thickness , to reduce the depression edge 160m or less, as shown in Figure 1b.

Accumulation of capThree-dimensional seismic data interpretation results that are developed in the Nanpu Sag in shallow 2 sets of regional seal a large fracture, and fracture types are not the same. But with the whole stretch of early, mid-stretch slip late Zhang twisting, stretching the early - mid-stretch slip, mid-stretch slip - Late transtension and early mid-stretch stretch ~ ~ late slip sheets twisted fracture six categories, as Fig. But this is not the fault 6 class can become Shahejie source rocks or sand some gas generated in the shallow cover upward migration Pathways. Only three sections of sand or sand connecting section of source rocks and overlying the shallow and the sand in the sand three sections or some source rock expulsion of a large number of - or the end of the deposition of Dongying Minghuazhen advanced deposition [5] activities break to become a three-stage sand or sand for some natural gas source rock in shallow cover up the migration of conducting fracture, can be seen from Figure 2, only the mid-stretch slip late ~ ~ Zhang twist and stretch early mid-stretch away ~ late slip sheets twisted type 2 fracture before becoming three sections of sand or sand some natural source rock



a. Sec mudstone cap rock



b. Hall Volcanic cap

Fig.1The thickness distribution of natural gas caprock in middle and shallow layers of Nanpu Sag

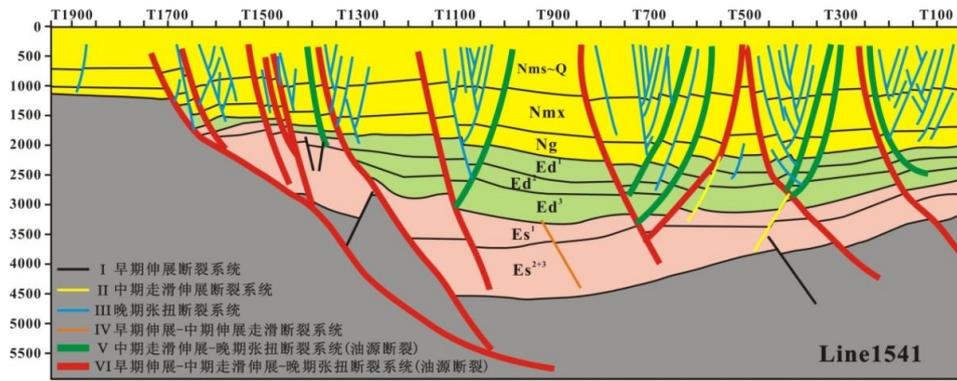
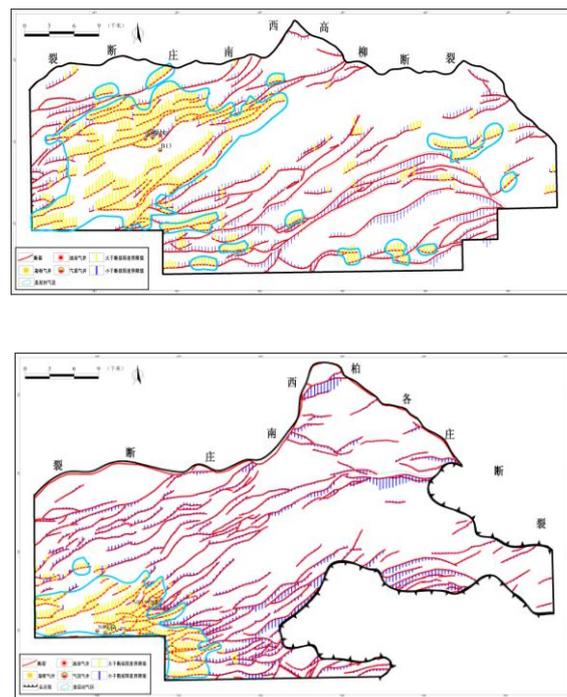


Fig.2 Division diagram of fault types in typical section of Nanpu depression

Cover up in the shallow gas migration conducting fracture. As can be seen from Figure 3, compared with conducting fracture development within the Nanpu Sag in shallow mudstone and Hall East Sec three sections of volcanic cap two sets, but different layers of development and distribution of different, but on the whole western sag and southern transporting faults, followed by the northern part of the recess, Sag conducting faults are undeveloped.



Sec mudstone cap rock
b. Hall Volcanic cap

Fig.3 The distribution of sealing area of natural gas caprock in middle and shallow layers of Nanpu Sag

By studying the relationship between the Nanpu Sag in shallow accumulation of East Third mudstone cap rock and the caprock Hall Volcanic Zone and gas distribution can be obtained by accumulation of the East Sec mudstone caprock and Museum Volcanic cover the closed zone between the distribution layer and gas mainly in the following two aspects.

As can be seen from Figure 3, the Nanpu Sag in shallow natural gas has been found mainly in the accumulation of the East Sec mudstone cap rock and the caprock Hall Volcanic area, which is located only

because the accumulation period East Sec mudstone cap rock and the caprock Hall volcanic area, migration upwards along faults underlying transporting sand or sand some three sections shale gas generated in order to be East Sec three sections of mudstone cap and Museum volcanic cAPROCK, migration and accumulation occurs laterally split into hiding; otherwise, no matter how good the other forming conditions, and no gas accumulation. No. 1 is configured as Nanpu currently found in natural gas are mainly distributed in shallow, shown in Figure 6, gas source correlation [20] the performance of natural gas derived from the underlying sand or sand period of three sections of the source rock, sand or three sections of sand shale gas generated in a period of accumulation of transporting broken up along the shallow cover of migration, due to the East Sec mudstone caprock only Np1 is not well at the closed region, through which the gas can migrate upward, and the rest are all part of the closed area, through which the gas can not migrate upward, natural gas, mainly in the east +2 mudstone cap under layer aggregated distribution. Since Np1 wells at East Sec mudstone cap is not closed, natural gas can be transported to move up on the East Sec mudstone caprock.

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