

Retardation of Oil Expelling within the Jurassic Abnormally Overpressured Fluid Apartment in Kuche Depression, Tarim Basin, Western China

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Kuche depression, characterized by overthrusts, is located in the north of Tarim Basin. In the east part of the depression, an oil field and a gas field were found in the Jurassic sandstone reservoirs of hanging wall and downthrow of the Yiqikelike overthrust, respectively. Prior to the occurring of the overthrust (ahead of Pleistocene), the Jurassic coal-bearing source rock had reached a maturation level of 0.9%Ro, generating a great deal of oil and gas. In the same time, an abnormally overpressured fluid apartment had been developing within the Jurassic due mainly to undercompaction, limiting the fluid flow and the mineral dissolution as well as resulting in a low porosity (2-3%) and poor permeability (0.1-0.6md) in the Jurassic interbedded sandstone reservoirs. The poor reservoir did not facilitate oil to migrate through, then retarded oil expelling from the interbedded coal-bearing source rocks. But some of generated gas could have been expelled.

From the beginning of Pleistocene, tectonism made the hanging wall uplift dramatically, consequentially giving rise to erosion down to some of upper Jurassic. Due to the main seal eroding of the upper Jurassic, the Jurassic abnormally overpressure within the hanging wall has been being changed into normal pressure during Quaternary. With fluid flow during the change of the hydrologic regime, mineral dissolving largely improved the porosity and permeability of the Jurassic sandstone reservoir, up to 15% and 85.0md, respectively. The oil expulsion, therefore, was enhanced by

the interbedded reservoir improvement and a commercial oil was accumulated in situ. But in the downthrow, the abnormally overpressure has retained up to now. And effective oil primary migration has not taken place all the while. So only gas primary migration and accumulation occurred in the downthrow.