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Formation mechanism of bedding fractures in the Lucaogou formation tight reservoir in Jimusar sag, Junggar basin

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Three types of fractures can be identified in the Lucaogou formation tight reservoir in Jimusar sag. The first type comprises structural fractures consisting of high-angle, middle- to low-angle, and horizontal fractures; the second type comprises Bedding fracture, mainly in the form of bedding fractures, and the third type comprises abnormal pressure fractures, mainly as drain fractures. Bedding fractures can be correlated with ancient tectonic stress, diagenesis, and corrosion by generated hydrocarbons and discharged acids. The sedimentary facies in the study area is favorable for the development of bedding; however, this does not mean that bedding fractures can develop in all beddings. According to preliminary research and analysis, bedding fractures mainly develop in spaces with good sorting and coarse grains along the bedding surface, which is verified by fractures in cores when they are removed from the core tube. On the basis of the analysis of spaces in which cracks are absent and the occurrence of oil stains, it has been identified that bedding fractures are in the form of micro cracks underground. Two types of models of fracture genesis are then proposed: one arising from structural diagenesis and another from hydrocarbon generation and acid discharge. The first type can be understood in that a marked layer is deposited because of sedimentation, and compaction by the pressure of overlying strata and diagenesis contributes to the bedding structure. Because there are differences in the mineral composition, texture, structure, and mechanical properties of rocks, differential stress can be easily produced by crustal movement or regional tectonic movement to form bedding fractures with horizontal dislocation. The other type is caused by generated hydrocarbons and discharged acids. According to the statistics, it is speculated that acidic water and hydrocarbons discharged by source rocks migrate along the cross-bedding surface, resulting in corrosion, and thus form fractures. In general, there are secondary dissolution pores near bedding fractures.

