TG05

Reservoir Sweet Spots in the Arabian Petroleum Basin; Types and Controls

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SUMMARY

Reservoir sweet spots are areas with better permeability relative to the surrounding country rocks. They represent a major opportunity in exploration and development of tight gas reservoirs. This paper describes the types of reservoir sweet spots in the Arabian basin and the most common factors controlling their development.

Three types of reservoir sweet spots are identified in the Arabian basin; tectonic, sedimentologic and diagenetic sweet spots. The tectonic sweet spots are areas with open fractures being the main control of reservoir productivity. The sedimentologic sweet spots are areas with coarser-grained and possibly thicker sandstone than the surrounding clastics, or areas where porous carbonate build-ups exist. The diagenetic sweet spots are areas with improved permeability due to re-crystallization, dissolution, dolomitization, or early grain coating caused by the flowing fluids.

The reservoir sweet spots result from the interplay of one or more of three factors; a) local redistribution of tectonic stresses at the heterogeneous basement fabrics, b) combined effect of sea level changes and sediment influx, and c) diagenetic processes acting on reducing rock volume and increasing its brittleness. Integrated geologic analysis of these factors is a key element to predict potential locations for sweet spots.