Determination of Direction of Pinchout of Lithologic Traps Using Concretion Analysis at Early Stages of Outlining of Oil Fools in West Siberia

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In drilling out a favorable area it may be possible even in the very beginning with but two wells to predict a tendency for pinchout by analyzing the concretionary nature of the authigenic part of carbonate-clastic rocks. If core recovery is poor, then geophysical logs can be used. Carbonate concretions show low values of resistivity and minimum natural gamma radiation.

The proposed method is based on study of systematic distributions of carbonate-clastic rocks in lithologically sealed pools of the Middle Ob region of West Siberia. Carbonate content of such strata ranges from 0 to 32%; it increases in the direction of pinchout where the coefficient of concretion development is maximum. In the Yuzhno-Surgut area the line of pinchout of the productive stratum is also the zone of maximum carbonate content and highest values of coefficient of concretion development. See Fig. 1.

The source of the calcium carbonate, which is so widely distributed in the Mesozoic of West Siberia, is largely organic material of tests of pelacypods and foraminifera and possibly some chemically deposited material. In zones of high energy deposition (sandy-silty facies) a large part of the particles of calcium carbonate was deposited in zones of more calm deposition along with the silt-clay facies. During diagenesis the calcium carbonate went into solution and was redeposited as concretionary material. As drilling progresses, the coefficients of concretion development are used to indicate the direction of facies change of reservoirs to shale outs.