

Analysis of dilatation of Gala Suite on Absheron peninsula

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The thickness of principal production unit in the South Caspian basin Productive Series within Absheron peninsula changes from 500-700m in the northern and northwest parts of peninsula (Fatmai, Novchany, Jorat localities) to 3000-3500 m in the southeast part (Qum Adasi, Zirya, Gavsany, etc.).

The thickness increase occurs because of: 1. increment of basal suites, which northward absent due to progressive onlapping, 2. southeastward subsiding.

Thus, the basal Gala Suite is not recorded in the most part of the peninsula. However, it is one of the production units in the many fields, where it occurs, and it remains one of the most “enigmatic” part of the Productive Series with still unclear depositional environment.

From log data Gala Suite is subdivided into 3 subsuites – mud-prone, sand-mud and sand-prone units. Sand fraction is mostly represented by fine to medium grain size; the share of coarse fraction does not exceed 2 %. Carbonate content varies from 1 % to 11 %, porosity and permeability on average are 18-25% and $22 \times 10^{-15} \text{ m}^2$ accordingly (Suleymanova, Ataeva, 2002). There is some difference between mineralogy of fine and coarse fractions. In a heavy fraction of mud prone intervals marcasite, celestine, anhydrite are dominating in sand prone intervals – minerals of disthene group and staurolite prevail. The maximum thickness of the Suite is 430 m.

Oil-and-gas bearing of the Gala suite is observed in many fields within Absheron peninsula. In the Gala, Zirya fields gascondensate accumulations take place. The sand content in the Gala field varies in the limits 12,7-26 %, mud content – 19,2-30,4 %, carbonates – 9,2-29,0 %, porosity – 5,4-16,5%, permeability – $20-132,0 \times 10^{-15} \text{ m}^2$.

In the Zirja field the average sand content makes 10,7 %, mud – of 31,1 %, carbonates – 0,2 %.

In the Surakhany field oil field the oil accumulation in Gala sediments was found in the east flank of a fold. On average sand content is 39,3 %, mud content – 13,7 %, carbonate – 8,5 %, porosity – 23,1 %.

In the Garachuhur field oil accumulation in the Gala suite was found in the eastern wingflank, and it is shielded by longitudinal fault. Reservoirs properties have been estimated as high as: porosity of 10,7-20,3 %, permeability $3,8-24,7 \times 10^{-15} \text{ m}^2$, carbonate content – 12,7-26,25 %,

In the area of Zikh field sand content in subunit Qala₁ changes within 23,4-70,9 %, share of mud – of 8,3-36,4 %, carbonates – 6,2-10,5 %, porosity – 16,9-22,2 %, permeability – $20,6-354,0 \times 10^{-15} \text{ m}^2$. In subunit Qala₂ – the share of sand fraction is 11,9 % on average, pelitic fraction – 16,5 %, carbonates – 13,9 %, porosity – 22,2 %, permeability – $297,0 \times 10^{-15} \text{ m}^2$; subunit Qala₃: sand content – 40,8 %, mud content – 7,5 %, carbonates – 8,2 %, porosity – 24,1 %, permeability – $167,0 \times 10^{-15} \text{ m}^2$.

The stratigraphical trapped accumulations in Qala₂ and Qala₃ have been revealed in the Hovsany oil field. Reservoir properties change among subunits: Qala₁ – sand content – 21,9-44,7 %, mud – 14,5-26,6: carbonates – 1,3-19,5 %, porosity – 9,8-27,6 %, permeability – $13,6-589,0 \times 10^{-15} \text{ m}^2$; Qala₂ – sand fraction makes 8,1-44,4 %, mud fraction – 11,9-34,4 %, carbonates – 7,4-21,9 %, porosity – 11,6-18,9 %, permeability – $9,4-147,1 \times 10^{-15} \text{ m}^2$; Qala₃ – sand content – 32,1-52,9 %, mud content – of 12,8-26,4 %, carbonate content – 8,4-17,3 %, porosity – 9,1-18,9 %, permeability – $10,0-512,3 \times 10^{-15} \text{ m}^2$.

The data obtained allows to have some conclusions on the spatial distribution of the gala sediment reservoir properties. Sand content decrease in the northeast direction and in the Qala field has the lowest value. The share of pelitic fraction changes in the more narrow limits, the lowest

value is observed in the Surakhany field. Carbonate content has the least value in the Surakhany field. Porosity decreases southward, while in the northwestward in the Surakhany field it has the biggest value. Boundaries of permeability are observed in the Hovsany field.

Our studies testify to good reservoir properties of Gala Suite sediments, which display considerable spatial variations within Absheron peninsula. These data allow us to estimate the reservoir potential of these rocks as from good to moderate. Southward inferior of reservoir quality of Gala Suite sediment allow us to predict their poor reservoir properties in offshore part of the South Caspian basin.