Characteristics of the Productive Horizons of Clastic Composition of the Cretaceous and Jurassic of Northeast Fergana

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In recent years commercial gas has been discovered in the Cretaceous and Jurassic sediments in the Mayli-Su folds, which are located in the area of the Mayli-Su Paleozoic projection. Nine productive horizons have been found in the Cretaceous section. Some of these are not persistent lithologically this hampers their recognition on electrical logs and their correlation.

VNIGNI workers have recently worked on a correlation chart of the Cretaceous productive horizons of the Fergana depression. This has yielded a more precise delineation of the contacts of the pay zones in northeast Fergana, has permitted an evaluation of each of them for oil and gas, and has enabled them to be correlated with corresponding horizons in other producing areas of south Fergana.

On this chart, horizons XIII-XV are correlated with the variegated formation of the Senonian, XVI and XVII with the Turonian, XVIII with the Kalachin, XIX and XX with the Kyzyl-Pilyal. XXI with the Lyakan, and XXII with the Muyan formation. Lower in the section is distinguished productive horizon XXIII, which is correlated with the upper Dogger. Within the area of the Mayli-Su Paleozoic projection, horizons XII, XIV, XV, XVIII, XIX, and XX of the Cretaceous and XXIII of the Jurassic contain commercial gas; these are largely granular reservoirs. These strata are separated by clayey-silty beds of different thickness, which satisfactorily isolate the gas pools in the strata.

Productive horizon XII, the highest in the section, is penetrated by numerous wells in the Kyzyl-Alma, Bedre-Say, Mayli-Su II-VI, and Izbaskent areas, and is commercially oil-bearing. See Fig. 1. In the north of this territory close to the Paleozoic frame the stratum is comprised largely of fine-pebble conglomerate with a sandstone member in the lower part. Pebbles 1-5 cm in diameter consist largely of pink pelitic limestone cemented by sandy material. The sandstones are variegated coarse-grained friable, quartz-feldspathic and poorly sorted, with an abundance of coarse fragments of light limestone. On the Mayli-Su III anticline the number of sandy beds within the conglomerates is greater, and on Mayli-Su IV the sandstones dominate over the conglomerates. Thin beds of brown siltstones and sandy clays come in here; their thickness increases markedly on the south flank of the fold. To the south of Shamaldy-Say and Vostochnyy Izbaskent, conglomerates practically disappear from this section, and the amount of clayey-silty rocks increases. The sandstones here are also variegated, predominantly fine-grained clayey. The thickness of stratum XIII increases regularly down the regional dip from 50 m in the Bedre-Say area to 80 m at Izbaskent. As a rule the thickness is 10-20 m less at the crests of structures than on the flanks. The variation in reservoir properties of these productive horizons is given in Tables 1 and 2.

As is evident from the Tables, down the dip toward the depression there is some improvement in reservoir properties. On the Mayli-Su IV, VI, and Izbaskent structures, high-producing gas pools occur in this stratum, whereas in the other areas testing yielded flows of formation water, sometimes with dissolved gas.

The lower occurring stratum XIV is overlapped by a member of variegated clays 30-35 m thick. The productive stratum is not thick, ranging from 5 to 22 m. Stratum XIV is poorly expressed lithologically. Many sandy beds pinch out and are replaced by siltstones and clays. In the north of the region in the sections of the Mayli-Su II, VI, and Bedre-Say folds the stratum consists of conglomerates and sandstones. To the south in the Mayli-Su III region and particularly on the west crest of Mayli-Su IV, the role of the sandstones increases and the amount of conglomerate decreases to complete disappearance from the section. Siltstones appear here among the sandstones. On the south flank of Mayli-Su IV and Shamaldy-Say the stratum is comprised entirely of sandstones and siltstones, and yet farther south in Vostochnyy Izbaskent, clay beds make an appearance. On the Izbaskent anticline this horizon is comprised largely of siltstones with subordinate clays and sandstones. The conglomerates in the stratum are fine-pebble, brown, and are comprised of fragments of pink limestone cemented by sandy-clayey material. The sandstones are variegated, quartz-feldspathic, coarse-grained, and poorly sorted. The cement in the sandstones consists of fine quartz powder and the products of destruction of feldspar. On the Mayli-Su anticline, commercial gas was recovered from this stratum. In the rest of the area the stratum was dry; in a few sectors formation water was obtained.

Stratum XV with a thickness of 11-25 m occurs at the base of the variegated formation, it is overlapped by a member of clay and siltstone with a thickness of 25-35 m. On the north of the Mayli-Su projection, horizon XV consists of conglomerates, and on the Mayli-Su III structure - conglomerates and sandstones. On the west uplift of Mayli-Su IV, beds of siltstone appear in the section, whereas on the rest of this fold sandstones and siltstones are present. To the south of the Mayli-Su IV fold, siltstones predominate.