Geological-Genetic Basis for Restoring High Effectiveness to Oil-Gas Exploration in Bukhara-Khiva Oil-Gas Region of Uzbekistan

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During the last 5-6 years the volume and effectiveness of oil-gas exploration in Uzbekistan have dropped sharply. This problem is addressed in five discussions as follows:

1. In the oil-gas regions of Uzbekistan - Ustyurt, Bukhara-Khiva, Gissar, Surkhandar'ya, and Fergana - a total of 160 fields with 337 pools have been discovered. Of these pools 12 are in the Neogene, 88 in the Paleogene, 10 in the Upper Cretaceous, 67 in the Lower Cretaceous, 37 in the Lower-Middle Jurassic, and 7 in the Middle-Upper Paleozoic. With respect to the number of pools discovered, total reserves, number of fields, and several other important indexes, the Bukhara-Khiva region far exceeds all the rest. The backlog of traps here stands at 137 known and 67 predicted. However, exploration has not yet begun on 67 and 15 of these, respectively.

2. Carbonate rocks must be exploration targets separately for oil and gas. A map was compiled in 1984 assessing oil and gas potential of the Jurassic carbonates of the Bukhara-Khiva region. It was subsequently further refined. This terrane was divided into the Kandym-Yangikazgan, Urtabulak-Mubarek, Beshkent-Kashkadar’in, and Shurtan-Shurasan exploration areas. The second and fourth of these are held to be the most favorable for discovery of oil fields.

3. Distribution of fields in the Bukhara-Khiva region is a basis for dividing the entire territory into two zones: Southern or main zone, and Northern or satellite zone. Most of the fields and all of the large reserves are in the main exploration zone. Consequently, most of the exploration should be concentrated in this main zone.

4. Probability of finding new fields. Fields with small reserves predominate in practically all productive regions of the world. For example, in the United States, of the 27,737 fields, 19,082 are oil, and 8,655 are gas. Of the 19,082 oil fields, only 44 or 0.23 percent are classified as having large reserves. Of the 8,655 gas fields, only 102 or 3.5 percent have reserves of the large category. Of the 160 fields of Uzbekistan, 35 or 26 percent are in the large category. In contrast to the United States, however, maturity of exploration is much lower, and there is high probability that new fields will be discovered.

John Hunt, Michael T. Halbouty, and others have stated that the density of fields in the United States may be used for predicting discovery. For example, 23,000 fields have been discovered in an area of 6.5 million sq km, or 3,500 fields for each million sq km. On this basis it is predicted that 175 fields will be discovered in Bukhara-Khiva region, 87-88 in Fergana, 43-44 in Surkhandar’ya, and 17-18 in Southwestern Gissar.

Taking into account the number of fields that have already been discovered and with a coefficient of success of 30 percent, it is predicted that 23-24 new fields will be discovered in Bukhara-Khiva region, 16-17 in Fergana, 3-5 in Surkhandar’ya, and 2-3 in Southwest Gissar. The largest reserves are expected in carbonates in the southeast part of the Urtabulak-Mubarek exploration area and in the south of the Beshkent-Kashkadar’in and Shurtan-Shurasan exploration areas.

5. In Uzbekistan, most of the pools of large fields and all the very large fields and the gigantic Shurtan field occur in Upper Jurassic carbonates. Most of these have been discovered in traps with areas of more than 100-200 sq km. No such traps are now in reserve, and the probability of finding any more is practically zero.

Discovery of fields with large reserves in traps with small areas (28-30 sq km) at Kokdumalak and Alan indicates that fields with large reserves can be present where thickness of the carbonates is great. For example, thickness of the carbonates at Kokdumalak is 275 m, and that at Alan is 195 m, whereas in Kandym field where reserves are about the same the thickness of the carbonates is only 44.8 m in an area of about 700 sq km. Consequently, the search for large fields must concentrate on the main exploration zone where thickness of the carbonates is great.