

Rational ore deposit drilling pattern with construction of cluster pumping wells in the artesian flow conditions

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Drilling pattern and quantity of technological (injection and production) wells in the uranium in-situ leaching is determined by the projection of ore deposit to the daylight surface, structure and hydrogeological characteristics of ore-bearing deposits and given well field productivity. The difference between the structure of production and injection wells lies in that the upper part of production well has a submersible pump which, compared to injection wells, requires installation in its the upper part of the casing string with larger diameter pipes to allow for the pump installation. As a result, the production wells can be operated in pumping and injection mode and injection wells only in injection mode.

The essence of the new scheme is as follows:

- All wells on the block are constructed as injection wells, i.e. without a larger diameter pipe being installed in the upper part of the string.
- The wells selected for operation as production wells, are leak-proof connected with “cluster” pumping wells by plastic pipelines.
- “Cluster” pumping wells up to 100m deep equipped with dead-end string with no screen are constructed near the power sources. Submersible pumps are installed in such wells with the total capacity to be determined by the design flow rate of the block and to ensure the steady, directional flow from injection to production wells. The minimum number of such “cluster” pumping wells is one per a well field, which well can be piped to up to seven wells designed for production.

As a result, the expenses on procurement of cable products and submersible pumps are reduced and funds for well drilling and their piping are saved.

The proposed scheme of well field development used under the artesian flow conditions allows not only for the cost reduction on operating block piping but also for the use of injection wells as production wells at different stages of block development by selecting any necessary combinations of technological wells. The preliminary calculations show that the operating costs go down and more uranium is extracted from the subsoil.

In 2013, the pilot block was built on Budenovskoye deposit and at this stage the technical and economic parameters of its operation are in line with the estimated parameters.

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