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New method for development of stagnant zones and man-made mineral formations for in-situ leaching

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Drilling of ore bodies (mineralization) that is more than 8-10 meters thick and imbedded in lithologically heterogeneous section creates some problems with full extraction of uranium from the subsoil. The maximum possible flow rate of production wells does not provide for the entire operating block thickness to be treated with process solutions, and different degree of permeability of ore- bearing deposits prevents from the uniform mining of the ore bodies. The final stage of such ore mining usually drags on and leads to further expansion of mining infrastructure (extra load on sorption) and increase of operating costs. On the other hand, construction of additional wells (2nd floor) on such ore significantly increases the unit cost of drilling (per kgU), as well as consumption of chemicals and electricity.

The method developed by the Company for the final mining stage of the block constructed on such ore suggests the following:

• The block is completely removed from operation. At this time, the process solutions get mixed and flow down by gravity towards the lower confining layer, and diffusion leaching processes become active.

• By using the artesian flow effect the injection wells are converted into production mode. Solutions produced from injection wells are collected into the movable tank with sulphuric acid being added to them and then these solutions are injected into all production wells during 30-35 days. It, therefore, creates a closed cycle of solution collection from injection wells and their feed into production wells. The reverse process results in acid solution penetration into the stagnant zones and involvement of previously unaffected mineralisation in mining.

• The block is then put into operation with the uranium concentration in pregnantsolutions increasing 2.5 - 4 times compared to the previous operation stage.

The use of such scheme made it possible to significantly shorten the final mining stage of four operating blocks, reduce operating costs and avoid additional costs on the well field reconstruction.

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