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# Development of ISL uranium mining in Kazakhstan

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In the second half of the 60s production of Uranium from low-grade ores by in-situ leaching (ISL) feasibility was proved. It fundamentally changed the situation in the raw material base in Kazakhstan.
Rapid development of ISL uranium mining in Kazakhstan was promoted by the availability of large sandstone type deposits.
As of 1 January 2014, identified and prognosticated in situ uranium resource in Kazakhstan is about 1.7 million tonnes U, with 77% of them available for ISL production.
Kazakhstan has not only a tremendous resource base, but also state of the art technologies of uranium mining and processing, and is being marketed by the full nuclear fuel cycle.
Kazakhstan became the world leader in uranium ISL mining technology.
Technological know-how enables to start uranium mining capacities in record time, during the one year.
Uranium mining in Kazakhstan today is being conducted at 22 sites. During last 10 years uranium production in Kazakhstan has increased 6 times and reached 22,500 tonnes U in 2013.
Since the first ISL site launch, the technology and uranium-containing solutions processing is being constantly improved. Uranium deposits development today is associated with a set of sophisticated technological approaches.
More and more complicated fields are being involved for processing, requiring a new fields design approach and screen positions. New methods for modeling and uranium mining forecasting are being successfully implemented.
For direct uranium determination problem solution there is offered logging prompt fission neutrons that expands the application scope of the quantitative uranium determination method in its situ.
Kazakh experts are the only in the world who successfully process suspended uranium deposits (not having lower aquiclude), and deposits with more than 700 meters occurrence depth of uranium ore, and herewith minimal ore mining mass volumes are being involved for refinement.
There is extensive experience gained in the advanced acidification application (leaching solutions feeding to the ore-bearing horizon without pumping), what gives the opportunity to get rich uranium-containing solution at an early stage mining block reprocessing, as well as reduces colmatation. Solutions for advanced editing of acidification come from refining blocks that allows to start remediation of aquifers at the blocks finalizing stage.
New polymeric and glass-reinforced materials were successfully implemented for storage equipment and pipe products manufacturing, which improves the tightness and reduces earth surface contamination to a minimum. The use of such materials in piping blocks allows deposit fulfilling with significant groundwater head above the ground.
Sorbtion-desorbtion U-shaped columns application allowed us radically change the approach to the processing complex design. There are being designed modules, consisting of one U-shaped column and 3 sorption columns. Modular approach to the engineering and construction allows us refining capacity expansion and gradual processing complex capacity increasing to more than 2 million tonnes of uranium per year.

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