Ukraine – the pioneer of in-situ recovery returns to this method of extraction

By

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ABSTRACT

In-situ recovery (ISR) transfers hydrometallurgical processing of mineralised bodies to the subsurface to directly obtain solutions of commodities. As a result, there is little surface disturbance. For ISR to be successful, however, deposits need to be permeable, and commodities need to be readily amenable to dissolution with an acceptable consumption of leaching reagents.

The Ukrainian paleochannel uranium deposits of the Dnipro basin were the first projects in the world where ISR technology was applied, particularly the Devladovskoye uranium deposit. Uranium extraction through ISR was used for these deposits until the 1980s when this method was suspended due to the discovery and development of significant roll-front uranium deposits in South Kazakhstan. Uranium mining continued, however, in Ukraine from the Metastatic deposit using conventional mining methods.

The Dnipro basin contains numerous small uranium deposits that may still be amenable to ISR.

Safonovka uranium deposit is the first paleochannel deposit that has been investigated by the Nuclear Energy Systems of Ukraine in the modern period.

Four potential methods of ISR may be used for extraction of uranium from the Safonovka deposit, as well as other deposits in the Dnipro basin:

- Sulphuric acid leaching (evaluated by field tests)
- Sulphuric acid leaching with hydrogen peroxide (evaluated by laboratory test work)
- Sulphuric acid leaching with oxygen gas
- Extraction by oxygen gas without acid (innovative technology used in Uzbekistan).

Sulphuric acid leaching with hydrogen peroxide is regarded as the most prospective method. However, the extraction of uranium by oxygen gas will also be evaluated, given it is the most environmentally friendly and potentially the most profitable method.

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