Slate oil and its prospects for Kazakhstan

WE GET THE SAME AS 75 YEARS AGO.

A steep fall in oil prices (almost three times for half a year) is associated with the optimization of the extraction of slate gas and slate oil in the United States. How and why did this happen?

Slate oil is an almost forgotten name of the widespread high-viscosity and heavy bituminous rocks in Kazakhstan lying mostly in the top parts of productive oil cuts. Geological reserves of high-viscosity and heavy oil in bituminous sandstones and collectors are widespread on Earth. Production, transportation and processing of slate oil are costly, at times greater than the cost of using a light low-viscosity oil. Because of this, exploration focused on the rarer light low-viscosity oil, while open deposits of extra-heavy oil belong to the category of off-balance.

As in other oil-extracting regions, in Western, Southern and Central Kazakhstan more than 80% of open and discovered fields fully or partially consist of deposits of heavy and high-viscosity oil. In the early sixties of the last century the geologist Aytpay Alzhanov estimated the reserves of heavy oil in the pre-salt deposits of the Western Kazakhstan at several tens of billions of tons. Of the 170 open relatively large oil fields, only about 70 were developed - due to the unprofitable production process. Heavy oil occurs usually at depths from 10 to 500 m. but for its production needed sophisticated technology and equipment. To extract slate oil from a porous collector, it is necessary to heat it along with layer the entire period of development for decades. The amount of fuel to heat the reservoir using the fluids pumped from the surface, comparable with recoverable reserves of slate oil.

Therefore, the deposits of this oil considered as off-balance, temporarily not recoverable. Only that part of the oil field that can be extracted at the current in fact primitive level of technology is called “balance reserves”.

The technology of extraction of "recoverable" oil reduced to sequential drilling of wells at the discovered deposit and transfer by means of cumbersome and power-consuming equipment of water from the reservoir to the fishery and from the fishery back to the reservoir.

The pressure in the borehole is lowering, and the low-viscosity oil from the surrounding section of the reservoir flows into it along with the underlying reservoir with water.

Liquids are pumped from the well by deep pumps. On an oil field water is separated and through delivery wells downloaded back in layer for "maintenance of reservoir pressure".

Over time, the water supply of pumped out products increases, and when it reaches 98-99% - the process of separating oil from water becomes unprofitable - that well is abandoned and a new well is drilled after.

 With this field development technology, 60% to 90% of identified geological reserves remain in the reservoirs. The more viscous oil, the more it remains in layer.

Oil Recovery Factor or ORF estimates ratio of oil volume that flows out the reservoir during the operation period, to the volume of geological reserves counted in the reservoir prior to its exploitation. The average final ORF on the developing fields is not more than 0.25.

And to all geological reserves taking into account off-balance sheet deposits that do not contain low-viscosity oils, ORF is even less than 0,1.

For supplies of light oil, exploration is underway in new areas and at increasing depths.

Recoverable reserves have to provide increase in production of the oil enterprises for the decades ahead. It was unprofitable to develop deposits of high-viscosity oil until there was a prospect to open new deposits in superficially lying deposits. However, the situation has changed. With the increase in oil consumption, were developed easily recoverable reserves at shallow depths and easily accessible areas. Costs of exploration works began to grow in proportion to a cube of depth and a square of distance. Even more intensively costs of development of the fields revealed at big depths and uninhabited territories – began to grow in water areas of the seas and behind the Polar circle.

There were problems of shortage of territories and a problem of protection of the surrounding environment on the landscapes involved in oil production.