N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF GEOLOGY AND TECHNICAL SCIENCES
ISSN 2224-5278
Volume 6, Number 426 (2017), 5 – 17

V. A. Popov, S. M. Ozdoev, L. L. Kuznetsova, S. A. Nigmatova, A. Kasymkhankyzy

Institute of Geological Sciences named after K. I. Satpayev, Satpayev University, Almaty, Kazakhstan.
E-mail: nigmatova@mail.ru

OIL SHALE OF SOUTH-TORGAY OIL AND GAS BASIN

Abstract. Prospects of oil and gas potential of the South Torgai oil and gas basin for the presence of "shale" hydrocarbons are considered.

The main features of the rocks, called "oil shale" – a fairly high content of organic matter (OM) under conditions of closed porosity, respectively, their low permeability and residence in the main zone of oil and gas formation for quite some time – about 40–50 million years. At the same time, ripe oil and gas remain in the conditions of a low permeable maternal suite.

Hydrocarbons contained in these low-permeability rocks can be produced on an industrial scale only after exposure to fracturing by fracturing, with drilling mud containing sand (proppant), which ensures the preservation of this man-made fracture and a set of chemicals that ensure oil separation from the mineral matrix.

As a result of the work done, the existence of a highly promising formation on the shale HC formations, the Karagansay Formation of the Middle Jurassic was justifiedin the South Torgai Basin. The next task will be to identify specific horizons (layers) containing hydrocarbons in low-permeability reservoirs. This is a task for specialists in field geology and geophysics to plan the next stage of experimental work on the problem of oil shale in search areas.

Key words: South-Torgay basin, oil shale, shale oil and gas, Akshabulak and Aryskumgraben-synclines.

Works on the topic: "Oil shale of the South Torgai oil and gas basin" were completed in 2015–2017. with the aim of studying the prospects of the basin to identify sediments containing oil shale and suitable for the extraction of "shale" oil and gas.

This problem is related to the "shale revolution" in the US and testing of its technologies in other oil and gas basins of the world. And if the US as a result of the widespread introduction of these technologies came out on top in the world in terms of hydrocarbon production, then in the rest of the countries the results are ambiguous, which indicates the complexity of the problem.

Extraction of hard-to-recover oil and gas reserves (in the media they are called "shale") began in the US in 2006 from the Barnett gas field, which was an experimental ground for the development of horizontal drilling technology with fracturing.

Success, comparable in effectiveness with the US data, was obtained in Argentina, Algeria and Australia. In other countries, the results are less certain or negative.

In Eastern Europe, the testing of "shale" technologies with the participation of American and European firms was completed with a negative result in Poland, Hungary, Bulgaria, Romania, Lithuania, Latvia, Ukraine. And in France, Germany, the Netherlands, there is a ban on the technique with hydraulic fracturing of reservoirs because of possible dangerous environmental consequences. In China, the experimental exploitation of deposits in the south-west and north-west of the country.

In Russia, experimental work in this direction is carried out in Western Siberia in the deposits of the oil-bearing Bazhenov suite of the Upper Jurassic, but the optimal method is under development.

The extraction of "shale" gas is carried out in a number of sedimentary basins from sediments of various ages containing organic matter C_{org}. from 2% and above, and sometimes from 1%in the US.

For shale oil, the requirements are higher, and for this, higher concentrations of C_{org} are needed, in the productive stratum, a higher quality organic matter, predominantly sapropelic or sapropel-humic, extraction of more than 90 liters per ton of "slate", thickness of the productive stratum 30 m and more.