Innovative exploration technologies

INTEGRATION OF EXPLORATION TECHNIQUES

The Robust Electromagnetic and Seismic Data Integration (ROKES[1]) technique, a new approach to geological modelling, was test-piloted successfully. It was designed to improve prospecting accuracy and cost efficiency based on the integration of seismic and electromagnetic survey data. Integration of exploration techniques optimises the number of exploration wells and has already reduced drilling costs in Western Siberia.

A PRIORI INFORMATION

In 2018, the Company and IBM Research Brasil launched the Cognitive Analytics for Geology project. The project aims to introduce cognitive computing into geological data processing and is expected to create a smart data processing technology that will accelerate decision-making and field development processes.

IMPROVEMENT OF DATA INTERPRETATION

In 2018, the Company and the Skolkovo Institute of Science and Technology developed software algorithms that will automate petrophysical modelling and streamline project-related decisions.

Another project started in 2018 aimed to measure saturation, porosity and permeability of the Achimov Formation (AF). In 2019, a pilot programme will be launched to select an optimal configuration of geographic information systems for AF wells. According to current estimates, the optimal set of instruments will save up to ₽ 2.52 m per well on geophysical well logging.

An object-oriented approach was tested for 3D seismic data correlation. Test results were integrated into available geological data to identify the specifics of reservoir distribution in each formation. This will improve accuracy of development simulation models that will be built later.

COGNITIVE GEOLOGY DIGITAL PROGRAMME

Implementation of the digital exploration programme will shift the focus on the need for machine learning and digital modelling competencies. The Cognitive Geology programme will improve the following indicators by 2025:
> −30% reduction in exploration time;
> +30% improvement in unit economics of exploration activities;
> +30% more informative data obtained.

[1] ROKES prospecting technique uses an electromagnetic model of a reservoir as a 'filter' for geological models. ROKES is a joint product of Gazprom Neft Scientific and Research Centre and Irkutsk Electroprospecting Company.

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VIRTUAL LABORATORY

The Company prototyped Virtual Laboratory, a solution for core and fluid analysis. Its online app is capable of monitoring instrument utilisation, reducing measurement time and streamlining the entire laboratory test cycle. Key data is obtained faster and can be fed into the model.

PROBABILISTIC FORECASTING OF RESERVOIRS

Methodology was developed to use seismic inversion for probabilistic forecasting of reservoirs. The technology saved over ₽ 500 m by positioning exploration wells more precisely (fewer wells were drilled to obtain sufficient information).

Technology

Geosphere Research Centre (Research Centre for Reservoir Systems)

Geosphere Research Centre will store up to 200 km of core[2] samples

In September 2018, Gazprom Neft and the Government of the Tyumen Region signed an agreement to establish a research centre for reservoir systems. Featuring innovative laboratory facilities and an advanced core sample warehouse, the centre will be part of the Company's local research cluster and a venue for industry conferences and education.

The core sample warehouse will be commissioned in 2022. Warehousing operations will be fully automated with Russian-produced robotic systems.

The Geosphere Research Centre is set to:
> integrate geological data on the Company's licence blocks;
> develop new reservoir assessment methods and techniques;
> develop digital core modelling techniques.

[2] Core is a rock sample from the well.

New development technology for the Bazhenov Formation

"Our primary goal is to increase the value of our exploration portfolio"

Future is beyond the polar circle

Gazprom Neft pilots non-seismic exploration techniques