Key performance results for 2018

COMPETENCY DEVELOPMENT AND IMPROVEMENT OF THE EXISTING ASSET PERFORMANCE

Stage II implementation of the Zarubezhneft JSC Corporate Development Strategy includes Upstream Segment Development as one of the priority tasks.

To achieve the target production profile, measures are being provided to develop the key process competencies and introduce the best engineering solutions in the following areas:

- Exploration operations – resource base expansion;
- Increase in the oil recovery factor;
- Search and application of new infrastructure solutions to cut capital and operating expenditures and reduce the commissioning terms.

Resource base expansion

The Company is using the following approaches to the organization of work on expanding the resource base:

- Integration of all available geological data. Detailed numerical regional / basin modeling, searching for unconventional traps.
- Development of technologies for improving the quality of the fieldwork and interpretation of seismic data.

An example of the successful application of the first approach is the discovery in 2018 of gas deposits at the EF Block 12/11 structure on a Vietnam shelf using a EF-1X well. The application of new technologies for collecting seismic data at sea using broadband systems and data processing with new algorithms together with the basin-modeling method allowed constructing brand new deep-horizon (over 4,000 m) geological structure models.

These geological models became the basis for forecasting new, implicitly-expressed facilities, including EF structures with low-permeable Oligocene reservoirs that previously did not have commercial prospects. The layers of this type were exposed to hydraulic formation fracturing (HFF) in the EF-1X well and tested successfully for the first time in the region. A ten-fold increase in gas inflow up to 600 thousand m³/day was obtained. 2P industrial category geological reserves were estimated at 3.1 billion m³, and 3P-category resources at 11.8 billion m³.

Another example of the transition to a new stage of a sharp increase in the information value of seismic data is experience in using longitudinal and transverse waves obtained using bottom recorders (3D/4C method) for forecasting the lithological composition of formation and fluid saturation of reservoirs. This allowed for allocation of additional 23 perspective areas at Block 09-1 developed over decades for setting up prospecting and exploratory drilling within the submerged and slope sites previously considered unpromising. At the same time, the total geological oil resources of new facilities are estimated at 181 million tons, incl. 18 million tons with a low geological risk and 106 million tons with an average risk.

The 3D/4C seismic investigation interpretation results have already been used in planning a geological exploration program for the following periods.

Increased Oil Recovery Factor (ORF)

The Company is successfully implementing technologies for increasing its oil recovery factor:

- use of technologies aimed at involving previously non-drained reservoirs (sweep ration) in exploitation;
- use of technologies aimed at increasing the efficiency of displacement from hydrophobic collectors (displ. ratio);
- selection of technologies for effective involvement of previously non-profitable reservoirs in exploitation.

The set of measures taken to increase the oil recovery factor have shifted the oil production trend in the Company to the positive side.

In the reporting year, Russian participants managed to initiate a program for using hydraulic fracturing at JV “Vietsovpetro” fields. Between July and September of 2018, 8 well operations were implemented. The wells where the HFF operation was carried out demonstrated significant gains in oil production (a 4.7 increase post hydraulic fracturing).

In addition, the polymer composition injection program was further developed to increase the sweep ratio at the Kharyaga Field in 2018. Implementation of Stage I in 2017 and Stage II in 2018 allowed the Company to achieve a total additional production with respect to the project of about 100,000 tons of oil. The technology allowed to venture into the development of poorly-drained zones, a reduction in the products’ water cut, as well as a higher sweep ratio.
Application of new infrastructure solutions

In 2018, as part of the Innovative Development Program approved by the Company’s Board of Directors, a number of projects were implemented for the creation and implementation of pilot-scale testing (PST) of new field infrastructure development technologies.

In 2016-2017, as part of an innovative project, the Company developed its own proprietary design documentation and fabricated an engineering prototype of a preliminary water discharge unit (NESTRO-KSI).

Basic technical solutions were developed taking into account the possibility of rapid redeployment to other facilities by road, rail and sea transport and direct location at remote fields in the absence of infrastructure facilities (exploration/single wells). In 2018, LLC ZARUBEZHNEFT-Dobycha Samara carried out a pilot test of a mobile plant (NESTRO-KSI). The test results revealed the plant’s efficiency; the capital expenditures for creating the plant are on average two times lower than those of a similar capital object. The NESTRO-KSI Plant may be commissioned on average four times faster than a similar capital construction project (6 and 24 months, respectively).
An innovative project for creating an oil-fueled power plant using all types of Russian-sourced oil was initiated in connection with the significant expenditures for purchasing diesel fuel for electricity generation at LLC “JC “RUSVIETPETRO” fields and difficulties in its delivery. The project is aimed at using Russian-sourced equipment (internal combustion engines of PJSC Kolomensky Zavod) for oil up to Class 3 inclusive (high viscosity and sulfur content) and increasing the operating life of energy-converting machines. The existing energy-converting machines, both foreign made and those produced by PJSC Kolomensky Zavod, require a high degree of oil treatment and are designed to work on light and low-sulfur class 1 oil. Implementation of the innovation project in 2017-2018 involved research, development and testing & engineering work on refining units of the power plant equipment operated using Class 3 oil, elaboration of design documentation, adaptation of the power plant to the oil industry norms and rules and carrying out pilot testing at LLC “JC “RUSVIETPETRO”. A diesel and oil power plant was developed and delivered to the Company’s field. The power plant underwent a PST (pilot-scale test) for diesel fuel operation and was transformed into an oil-fired power plant to carry out oil-fired PST and to further test upgraded equipment and components as part of research and development. The power plant’s operating time amounted to more than 5,460 hours, its diesel fuel saving was 1,146 tons, and the economic effect exceeded RUB 43.2 million.

In 2018, the Company implemented a technological development project to develop a concept for exploiting marginal areas of offshore fields. The project considered a number of technical solutions and technologies aimed at improving the efficiency of marginal offshore fields (automated machining, delivering personnel without using helicopters, optimization of drilling, integrated approach to connecting new facilities to the existing infrastructure, arrangement of two adjacent areas from one platform, etc.) Comprehensive application of these solutions in some cases leads to an increase in NPV projects by more than 2 times compared to traditional approaches.