

# Uncompleted wells fund creation program and its role in ensuring sustainable development of the oilfield services industry in Russia

<sup>1</sup>Katysheva E.G.

<sup>1</sup>St. Petersburg Mining University, Russia, helene\_la\_belle@mail.ru

## Abstract

The article notes that one of the most important criteria for the efficiency of the oil industry is the sustainable development of oilfield service companies, while the leading role of the drilling segment in the total volume of the oilfield services market is determined. The negative impact of the OPEC + agreement on the results of production and financial activities of oilfield service organizations was revealed. The need to develop measures of state support for the industry during the period of the OPEC + agreement was noted. The content and purpose of the drilled but uncompleted (DUC) wells fund creation program as a tool for flexible response to changes in the oil market conditions are characterized. The international experience in the field of DUC wells fund creation is considered. An assessment of the effectiveness of the formation of DUC wells fund at one of the oil and gas condensate fields in Russia has been carried out.

**Keywords:** oilfield services, oil drilling, drilled but uncompleted wells, OPEC + agreement.

## INTRODUCTION

At present, one of the most important conditions for maintaining the competitiveness of Russian oil producing companies in the world market is the sustainable development of the domestic oilfield services market and the production of domestic equipment that meets the modern requirements of the industry.

The scope of activities of oil service companies includes: implementation and exploration drilling, well workover, geological exploration (including seismic exploration, non-seismic geophysical surveys), geosteering, the technical process of oil preparation and production, maintenance of equipment in the fields.

A specific feature of the oil service industry is a rather low (up to 10%) profitability with a high capital intensity [7]. This leads to the fact that even minor fluctuations in market conditions become very sensitive for companies.

In 2020, the volume of the oilfield services market in Russia was fixed at the level of 21.9 billion US dollars [13], which amounted to 79.6% of the previous year's level (Fig. 1) and was characterized by the structure presented in Table. 1.

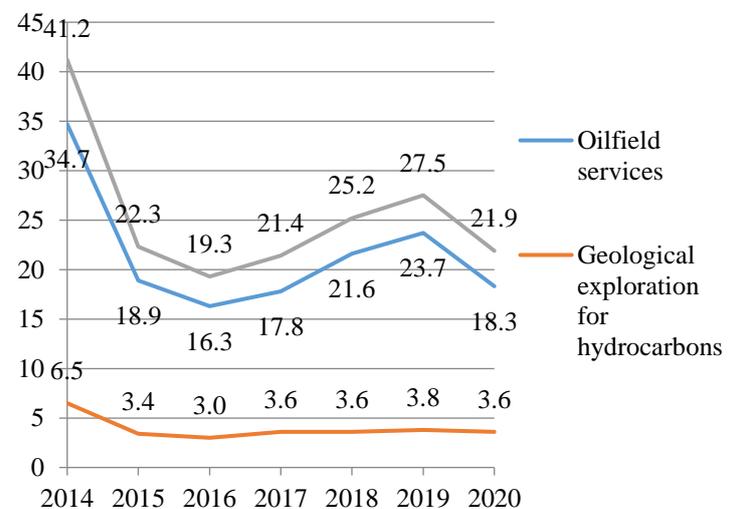


Fig. 1. The volume of the oilfield services market in Russia in 2014 - 2020, billion

Source: Compiled by the author based on [13]

Table 1 Segments of Russian oilfields services market in 2020

Type of works	Shares, %
Production drilling and side-tracking	33
Drilling services	16
Cementing	4
Well completion	10
Hydraulic fracturing (including multi-stage)	9
Other	28

Source: Compiled by the author based on [4, 6, 11]

As can be seen from the table, the most important segment of the oilfield services market is the drilling market, in which the production drilling market (services of a drilling contractor) and technological drilling services can be distinguished. Drilling services include the provision of a range of high-tech services, of which the most expensive are: well drilling in real time, drilling fluid service, bit service [5]. It should be emphasized that it is in the segment of drilling services that innovations are generated that contribute to increasing the efficiency of drilling.

In turn, the volume of drilling operations determines the number of geophysical surveys performed while drilling and affects related services such as cementing, well completion, etc. [12].

Due to the fact that the key function of drilling companies is to ensure the stability of oil production, sustainable development and increasing the efficiency of their activities is one of the main criteria for the efficiency of the oil industry as a whole.

### Problem statement

In Russia, at present, about 46% of the oilfield services market is occupied by Russian independent companies, 36% of the market

belongs to oilfield service divisions embedded in the structures of leading vertically integrated oil companies (VICs), 18% to foreign corporations [11]. In terms of customer relations, the market is dominated by affiliated drilling companies, with more than 75% of the drilling volume per client [4].

It should be noted that for the period from 2009 to 2019, the processes of import substitution of high-tech services significantly intensified, there were significant positive qualitative and quantitative changes in the industry: the number of active drilling rigs increased by 2.1 times, the number of hydraulic fracturing fleets - by 2.04. times, the volume of penetration by drilling increased by 2.03 times [9].

However, in 2020, the economic consequences of the coronavirus pandemic, which also affected related industries, were among the main factors affecting the oil industry. In March 2020, oil prices fell below \$ 20 per barrel, while WTI futures reached negative values. In order to stabilize the oil market in April 2020, the leading oil-producing states entered into an OPEC + agreement, which is valid until April 2022. In accordance with this agreement, Russia has undertaken to reduce oil production by August 2020 by 2.5 million barrels per day, from September - by 2.01 million barrels per day, and from January 2021 - by 1.5 million barrels per day. [18].

According to experts [2, 10, 14], the amount of obligations to reduce production in 2021 - 2022 significantly exceeds the volume of production, which was usually provided by drilling new wells. This circumstance will undoubtedly lead to a significant drop in demand in the Russian oilfield services.

In 2020, oil production decreased by 8.5% compared to the previous year, which caused a decrease in drilling volumes by 1.5%. In the first 6 months of 2021, oil production decreased by another 3.7%, and drilling volumes - by 7% [8]. The decline in oil production is forcing producers to cut their investment programs for drilling operations, which leads to downtime for a significant

proportion of the rig fleet of oilfield service companies. Due to the reduction in production, many tenders for the supply of equipment were canceled, only 25% of the volume of purchases of drilling rigs planned by the companies were realized. As a result, the drilling market decreased by 50% compared to 2019 [3]. In addition, reductions affected such segments as sidetracking to increase production at old fields, well workovers, well logging, hydraulic fracturing. Mining companies are currently being forced to renegotiate existing contracts by extending payment terms to their contractors or lowering prices for work and services.

In this situation, oilfield service companies are reducing their budgets and reducing the volume of orders for oilfield services [13, 15]. This leads to a shortage of working capital and a decrease in the liquidity of oilfield service companies, especially those that have actively attracted external funding. As a result, there are significant risks of falling profitability of enterprises in the industry. A consequence of a decrease in the volume of orders will inevitably become an aggravation of competition in the market, which in turn will cause a number of companies to leave the market.

In the absence of systemic measures to support the industry from the state, the vacated market share can be occupied by foreign oil service companies, which will lead to the loss of key competencies in such high-tech and strategically important areas as geophysical research of wells, seismic exploration, specialized software [1, 27, 28].

The gradual recovery of global demand for oil and the presence of prerequisites for its further growth [15, 23, 24, 29] make it possible to predict a slow revival of the Russian oilfield services, and in particular, the drilling market, which has significant potential [15]. The main directions of the industry development for the period up to 2030 are intensive development of hydrocarbon reserves in Eastern Siberia, as well as drilling of production and exploration wells in depleted fields in Western Siberia. The deterioration in the quality of reserves, as well as the growing demand from customers for

high-tech work, require large-scale technical re-equipment from oil service companies, which has to be carried out in conditions of low profitability, growing debts and a lack of available funds.

In the context of the post-crisis growth in oil demand for Russia, an extremely important task will be to promptly restore the lost market share, and the prospects for further increasing production volumes will depend on the level of development of the oilfield services industry [16, 33]. In this regard, it seems necessary to develop measures of state support for Russian oilfield service companies, even if there is no production need during the period of the OPEC + agreement.

## Discussion and results

Одним из направлений решения задачи по совершенствованию управления объемами добычи на государственном уровне стало инициирование программы по созданию фонда незаконченных скважин (ФНЗС) с целью поддержки нефтесервисной отрасли. One of the directions for solving the problem of improving production volume management at the state level was the initiation of a program to create drilled but uncompleted wells fund (DUC wells fund) in order to support the oilfield services industry.

Wells are considered uncompleted if the construction has passed the drilling and cementing stages, but has not entered the completion and development stages (includes the installation of downhole equipment and inflow stimulation), hydraulic fracturing has not yet been carried out [17]. However, today the precise definition of an unfinished well has not yet been formulated. According to experts [4, 5, 12], it is fair to call unfinished wells that have not yet been fully completed by construction, but at the same time are in such a technical condition that ensures the safety of this structure in relation to personnel and the environment.

The goals of the DUC wells fund program creation are:

1. Ensuring the possibility of a rapid recovery of oil production after the expiration of the OPEC + agreement in April 2022.

2. Supporting Russian oilfield service companies to maintain their satisfactory financial condition and production potential, including human and technological potential.

3. Preventing the reduction in revenue of oilfield service organizations below the level of 80% of the values of this indicator in 2019 [17, 30].

The volume of the program is estimated at 400 billion rubles, which corresponds to 27% of the annual revenue of the oilfield services industry or about 50% of the annual volume of the drilling market [6]. Within its framework, it is planned to drill 2,700 unfinished oil wells.

The mechanism for implementing this program of state support for the oilfield services industry involves the formation of special companies (SPVs) in the form of a joint venture of a vertically integrated oil company (VIC) and a syndicate of banks with participation shares of 2% and 98%, respectively [19]. Credit resources will be partially provided by commercial banks, in this case PJSC VEB will act as a guarantor. It is planned to conclude general contracting agreements between subsoil users belonging to the vertically integrated oil companies and a special company SPV, in accordance with which SPV will carry out the construction of wells and infrastructure facilities using borrowed funds. At the same time, the formation of orders, management of drilling operations and supervision are the responsibility of the vertically integrated oil company. After completion of the work, drilled but incomplete wells remain on the balance sheet of a special company without transfer to commercial production until the expiration of the OPEC + agreement. In the future, it is planned to transfer the wells to an oil production company, which makes payments, commissions facilities and registers ownership. At the time of transfer of wells to the balance of the subsoil user, the state provides him with

a tax deduction, which will be applied for three years from January 2022. Such a deduction is supposed to be provided to oil companies that in 2019 paid the mineral extraction tax (MET) on more than 1 million tons of oil produced [11]. The amount of the tax deduction is determined at the level of the key rate of the Central Bank of the Russian Federation from the amount of SPV expenses for the construction of facilities or expenses of the mining company for servicing borrowed funds.

The total amount of tax deduction for 2022 - 2025 is planned at the level of 32.15 billion rubles [6]. At the same time, the specified amount will be compensated for by tax revenues from new wells, commissioned as early as 2023. Additional state budget revenues received from the implementation of the program are estimated at 1.15 trillion. rub. for the period of the program [10]. Thus, the proposed mechanism seems to be economically beneficial for all parties involved - the state, banks, production and oil service companies.

However, at present the question remains unresolved, how exactly the mechanism for granting the deduction will be implemented. If initially the subsidizing of the interest rate for companies was discussed, now a special mechanism for deducting interest from the tax base is proposed. Such an implementation of the mechanism reduces the effectiveness of the proposed deduction due to the fact that income tax is subsequently taken from this deduction. Moreover, such an implementation of this system flexibility tool will necessarily entail a reduction in revenues to the regional budget. According to experts [1, 2], the use of the stock of unfinished wells should be only an operational measure that is required to maintain the oilfield services industry in the context of the current crisis. And for the long-term development of the segment, it is necessary, first of all, to create a number of favorable conditions for the creation of new technologies, such as, for example, soft loans or subsidies at the early stages of field development.

According to the Ministry of Energy of Russia, the implementation of the DUC wells fund creation program will provide oilfield service

companies with the necessary orders until April 2022 [11]. Under these conditions, contractors will be able to retain jobs, as well as valuable equipment that can be used after the restrictions are lifted. In turn, vertically integrated companies expect that the proposed mechanism will allow them to quickly increase production after the restrictions are lifted [8, 9]. Moreover, such a uniform loading of oilfield service companies with orders helps prevent sharp fluctuations in prices for services and work, which in turn contributes to high-quality planning of the investment budget of vertically integrated companies. In addition, it can be assumed that using the services of contractors that operate in a competitive market area may be more effective than creating their own services in related areas.

Despite the considered advantages, the implementation of the DUC wells fund project is associated with certain risks. The main risk lies in the persistence of production restrictions. If restrictions on the rate of production are not lifted, vertically integrated companies will not be able to increase production and, as a result, will not buy wells from banks. Thus, the main risks are borne primarily by banks. In order to agree to the implementation of the project under consideration in a similar format, it may be necessary to provide a certain state guarantee.

The idea of the DUC wells fund creation program is based on the study of international experience in the field of uncompleted wells fund creation. Unlike Russia, a number of countries - leaders in terms of oil production and export - have repeatedly faced the need to promptly regulate production volumes. As a response to sudden negative effects of external factors, they formed mechanisms that provide significant systemic flexibility and stability in non-standard conditions [25, 26].

In particular, in the production of shale oil in the United States, uncompleted wells have long been an important tool for flexible response to changes in the oil market, and the country has a leading position in the number of uncompleted wells. So, with a fall in oil prices in 2014 - 2016. the share of uncompleted wells in the

USA increased from 23% to 75%, after which it stabilized at the level of 50% [31, 32]. In November 2014, as oil prices plummeted, several US oil and gas companies and operators faced difficulties trying to maintain production from existing production wells while reducing investment in new wells. Despite the fact that the capital expenditures of US oil and gas producers decreased by more than 30% in 2015 [21, 22], the number of wells drilled continued to grow due to the attempts of operators to fulfill drilling contracts and maintain lease reserves. This led to a rapid increase in the number of wells that were drilled but were never completed and brought onstream as oil prices continued to remain below break-even prices in most US hard-to-recover fields [31].

It should be noted that so far the Russian oil industry has lacked such a comprehensive mechanism for prompt response to a sharp change in market conditions, in particular, a fall in prices or overproduction of oil. In these conditions, the DUC wells fund creation program should become one of the primary responses to a qualitative change in conditions after a long period of continuous growth in oil production.

В настоящее время выход из ограничения добычи по сделке ОПЕК+ происходит с опережением первоначального графика и задача, которую фонд незаконченных скважин выполнял бы в качестве поддержки нефтесервисной отрасли, будет достигаться за счет более раннего наращивания нефтедобычи. Тем не менее, идея и задачи программы создания ФНЗС остаются актуальными, поскольку создаваемый фонд скважин позволит более гибко реагировать на изменение мировой конъюнктуры. Currently, the release from the production limitation under the OPEC + deal is ahead of the original schedule, and the task that the DUC wells fund would fulfill in support of the oilfield services industry will be achieved through an earlier increase in oil production. Nevertheless, the idea and objectives of the DUC wells fund creation program remain relevant, since the well stock being created will make it possible to more flexibly respond to changes in the global situation.

Безусловно, решения о формировании ФНЗС в рамках конкретных вертикально интегрированных нефтяных компаний должны приниматься с учетом специфических особенностей разрабатываемых месторождений. Рассмотрим порядок оценки эффективности создания ФНЗС на примере Новопортовского нефтяного месторождения. Of course, decisions on the of the DUC wells fund formation within the framework of specific vertically integrated oil companies should be made taking into account the specific features of the fields being developed. Let us consider the procedure for assessing the effectiveness of the DUC wells fund creation on the example of the Novoportovskoye oil field.

Currently, the project operator is Gazpromneft-Yamal LLC. The active stage of development of this field began relatively recently. Thus, 117 exploration wells were drilled in the field as early as 1987, but its active development began only in 2010.

An important factor in choosing a project is its size, as well as the amount of hydrocarbons occurring in the field. As of December 31, 2019, the proved and probable hydrocarbon reserves are estimated at 188.9 million toe. This fact allows us to fully reveal the positive effect of the proposed structural flexibility tool.

The relative novelty of the project is also of interest due to the use of innovative technologies at the considered field, declared in the company's strategy. When analyzing the current state of the oilfield infrastructure, as well as the conditions necessary for the implementation of the project to form the DUC wells fund, to maintain the stock of oil wells in a serviceable state, a sufficiently developed infrastructure for transport and storage of hydrocarbons is required at the field. The Novoportovskoye field fully meets these requirements. Significant volumes of hydrocarbons produced on its territory (7.1 and 7.7 million tons of oil were produced at the Novoportovskoye field in 2018 and 2019, respectively) require a network of oil pipelines

that allow efficiently bringing new wells into operation without fear of an exit. them out of order.

To assess the effectiveness of the creation of unfinished wells at the Novoportovskoye field, it is proposed to consider a plan for putting wells into operation, having data on the increase in production from each well, the timing of drilling and its cost in conditions of the onset of production restrictions. The initial data were obtained from the Gazpromneft-Yamal LLC and the international consulting company Wood Mackenzie [20]. In this situation, there are two alternatives to consider:

a) development of a certain section of the field with the creation of a DUC wells fund and the prompt commissioning of such wells in the conditions of the cancellation of restrictions;

b) development of the same section of the field without using the DUC wells fund, with a decrease in the rate of drilling in conditions of limited production and a gradual increase in the rate of production immediately after the removal of the restrictions.

Let's consider each of the alternatives in detail.

Option A. With this approach, drilling of uncompleted wells will continue during the production restriction period. The peculiarity of this approach is that drilling will take place directly from the wellhead to the top of the formation, so as not to directly induce fluid inflow into the wellbore. Upon reaching the roof, drilling stops and the well is preserved. At the moment the restrictions are lifted and / or the energy carrier prices rise, the well is drilled through the productive formation to the target bottom, ends, mastered and put into operation. Undoubtedly, the cycle "reactivation - completion - development" is shorter than a full cycle of drilling. Thus, it is possible to gain some advantage in choosing this alternative, bringing the wells into production with minimal time costs. Moreover, if drilling is taking place in an environment of reduced demand or oil prices and / or current production

restrictions, there is a possibility of a partial reduction in capital costs for drilling due to a systemic decrease in demand and prices for oilfield services.

Option B. With this approach, during the period of current restrictions, there are no capital costs for drilling unfinished wells, and the implementation of the drilling program continues immediately after the restrictions are lifted and the energy carrier prices rise.

For the feasibility study, site X of the Novoportovskoye oil and gas condensate field was selected. The area includes 119 production and 25 injection wells.

According to a report provided by Wood Mackenzie, the average production rate of one oil well is 600 barrels per day, which is equivalent to 81.84 tonnes of oil per day. The average production rate of new wells drilled in 2020 was 1,350 barrels per day, which is equivalent to 184.14 tons of oil per day [20].

The cost of drilling works is calculated based on estimates for drilling similar wells in the field.

To substantiate the effectiveness of the proposed solution, two models of the well drilling schedule were built - with the first model, the drilling rate does not decrease, and the costs of completing the oil well zone are transferred to the moment the restrictions are lifted, the second model takes into account the decrease in the drilling rate. A production limitation was also modeled, similar to the limitation imposed by the OPEC + cut-off agreement. The planned timeframe for the project is from 2021 to 2049.

The combined NPV plots for the two alternatives are shown in Fig. 2. It can be seen from the graph that alternative A gives a more significant increase in NPV at the time the restrictions are lifted.

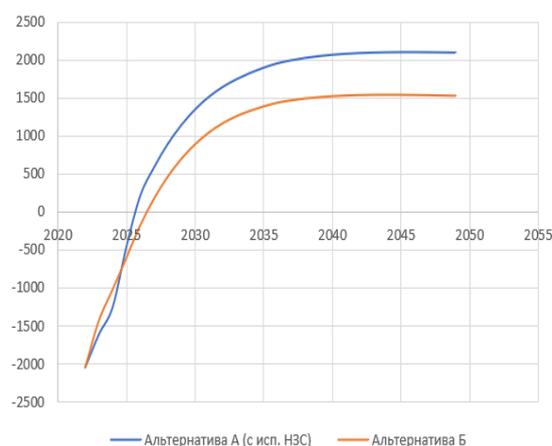


Fig. 2. Comparison of NPV indicators of options A and B

Thus, according to the presented indicators, one can judge the efficiency of the DUC wells fund in the considered area of the Novoportovskoye oil and gas condensate field.

## Conclusions

The fund of uncompleted oil wells, if formed in Russia, can serve as an incentive to create a potential resource base for the fastest possible recovery of oil production after the completion of the OPEC + deal, but subject to confirmation of these reserves.

The artificially created demand for oilfield services, created as a result of the implementation of the support program for the companies in the industry, will make it possible to avoid further reductions in the personnel of these companies, loss of competencies, and bankruptcy of oilfield service organizations. The DUC wells fund creation will allow avoiding breaks in technological chains, loss of jobs, and a reduction in the volume of orders in related industries.

In case of successful implementation of the program, Russian oilfield service companies will be provided with orders until the expiration of the OPEC + agreement (April 2022). Due to the DUC wells fund formation, it is possible to anticipate the creation of new production capacities to compensate for the wells retired as a result of this transaction.

The implementation of the DUC wells fund creation program, in addition to the rapid recovery of oil production in 2022, may lead to the emergence of the ability of the oil industry to flexibly and effectively respond to unpredictable manifestations of external factors and associated risks. At the same time, the program reflects the priorities of state policy focused on innovation and sustainability of the oil industry.

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