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LOCALIZATION OF EQUIPMENT PRODUCTION FOR THE OIL INDUSTRY IN THE RUSSIAN ARCTIC

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Abstract

The main economic problems of oil fields development in the Arctic zone of the Russian Federation under the conditions of an economic crisis and an adverse foreign policy situation are characterized in this article. The main way to decrease the influence of sanctions in the sphere of oil extraction is a significant decline in the market share of foreign companies using import substitution. It has to be mentioned that localization of equipment production and development of technologies for sea oil production in the Arctic zone of the Russian Federation can become incentive for import substitution, and attracting foreign investments into the Russian oil and gas sector. The most significant examples of creation of new productions in the Arctic zone are given in this article. The particular attention is given to development prospects of seismic works in the Arctic shelf under sanctions and fall in oil prices. The Russian sea geophysical companies are not equipped with modern specialized ships for holding 3D seismic exploration. As a result, the seismic works which are carried out now on the Russian shelf 3D in technological parameters considerably lag behind the world level. However, the ensurance of import substitution in the sphere of geophysical oilfield service is accompanied by a number of serious economic problems. It is concluded that localization of production capacities and service bases near the Arctic shelf will provide multiplicative economic effect, and also will serve as incentive to qualitatively new industrial and infrastructural development of northern territories.

Keywords: Arctic, import substitution, production localization, oil and gas complex, geophysical surveys.

1. Introduction

The main hydrocarbon reserves in Russia are located in difficult geological and natural climatic conditions within onshore and offshore areas of the Arctic region. Over the period from 1970 through 2015, the depth of the Arctic region of the Russian Federation has output more than 17 billion tons of

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hydrocarbons (in oil equivalent). Liquid hydrocarbons account for 19.7% of this output. Gas ranks first amongst hydrocarbons extracted in the Arctic region of the Russian Federation, however, it should be noted that oil and condensate have shown the trend to grow from 8.8% in 1990 to 13.6% in 2014. In 1995 a share of natural gas output in the Arctic region in the national production was maximal, reaching 90%. The peak (27.6% in global output) was reached in 1991. In 2014 these shares reduced to 80.6% and 15.2%, respectively (Bogojavlensky, & Bogojavlensky, 2015).

Prime importance of Arctic oil and gas projects for the Russian and world economies cannot be overestimated. According to the experts' research, the Arctic deposits will give up to 18 million tons of hydrocarbons by 2030, which will account for 3.5% of the overall oil production in Russia (Kutuzova, 2015). Therefore, the Arctic region of the Russian Federation possesses a great potential of hydrocarbon reserves thus being capable of meeting the national demand (both for domestic use and export).

2. Problem statement

A major concern for the oil and gas sector of Russia, which has led to serious financial and process problems in the context of economic crisis and deteriorated situation in the foreign policy is a high level of dependence on foreign suppliers of equipment, technologies and oil-related services. The companies Halliburton, Schlumberger, Weatherford, Baker Huges dominating the market of equipment and technologies for offshore hydrocarbon production possess huge financial, technological and personnel resources, which is incomparable with those of domestic enterprises (Andrianov, 2015).

Due to economic sanctions imposed on Russia, supplies of foreign technologies for exploration of hard-to-recover reserves, development of deposits on the deep-water (over 152 meters) and Arctic shelf, new technologies for increasing the oil extraction ratio, and equipment for high-technology oil and gas service have been prohibited. The targeted package of sanctions was imposed on the largest Russian oil and gas companies to restrict their access to the western capital markets, certain kinds of equipment, services and technologies. Moreover, cooperation between Russian and foreign companies in implementation of major future-oriented oil production projects in Russia have been suspended. In particular, the following projects were paused:

- Cooperation between ExxonMobil and "Rosneft" under 9 projects, including light tight oil production in West Siberia, as well as survey by boring in the Kara Sea;
- Joint activities carried out by companies "Gazprom Neft" and Shell on the significant project within the joint venture "Salym Petroleum Development" on survey and development of light tight oil in the Bazhenov formation in West Siberia;
- Agreement between LUKOIL, OJSC and Total on the establishment of a joint venture for Bazhenov formation exploration;
- Cooperation between Halliburton and "Gazprom Burenie", LLC.

It should be stressed that the drill platform "Prirazlomnaya", which is the only platform currently operating in the Arctic region, is serviced by Russian companies. However, it is 90% fitted with foreign equipment (Laptev, 2015). The halt in spare-parts supplies for the platform by company NOV has forced Gazprom, OJSC to pay attention to the products made by Russian companies.

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3. Research questions

Considerable reduction in the share of foreign companies through extensive import substitution can be used to neutralize efficiently the impact of sanctions in the area of hydrocarbon production.

In our view, localization of equipment production and development of technologies for offshore oil and gas development in the Arctic region of the Russian Federation may contribute greatly to import substitution, as well as to attraction of foreign investments to the Russian oil and gas sector.

Localization of production at a level of 75% and implementation of offshore projects on new terms will attract around 500 billion dollars of direct investments to oil and gas extraction over 30 years (Moseev, 2016). However, today it seems useful to focus on accelerated mastering technologies for production of domestic import-substituting products.

It is evident that currently to produce oil and gas equipment for exploration of the Arctic region of the Russian Federation would be more economically viable in industrial areas. Domestic manufacturers and foreign companies localizing their production outside the Arctic region take advantage of this localization over the competitors localized in the North.

Now, the Russian enterprises located in the northern regions have to search for new business and procurement opportunities. In order to support localization of production of equipment and technologies, in the city of Archangelsk, the “Sozvezdiye” Oil and Gas Industry Suppliers Association was established, and in the city of Murmansk – a similar association “Murmanshelf” was formed. Activities carried out by these associations allow for preservation of potential for implementation of the import substitution program in the oil and gas sector in the Arctic region.

Let us describe the most vivid examples of implementation of import substitution by national companies of the Russian North.

Russian engineering companies Production Association “Sevmash”, OJSC and Ship Repair Center “Zvezdochka”, OJSC (Severodvinsk, Archangelsk region) have a vast experience in production of offshore oil-extracting facilities, namely, drill platforms, well rigs, and lower bottoms of semisubmersible platforms for foreign customers.

Professionals from Production Association “Sevmash”, OJSC created and launched the package of design and process developments for production of general-purpose draw-works, column equipment, wellhead equipment, and integrated the processes of transportation and erection by floating of large metal structures of cold-resistant steel.

It should be mentioned that experience of arctic defense enterprises in the field of production of equipment for extraction and processing oil and gas has been increasingly sought after. In particular, Ship Repair Center “Zvezdochka”, OJSC, when preparing for the development of the Shtockman filed, has mastered the production of components for deep-water production systems, implemented the training program for assembly, testing, adjustment and maintenance of the equipment for hydrocarbon extraction offshore.

At the premises of this company, the Center of propulsive systems has been organized, which can be referred to as one of the best examples of import substitution and localization of production facilities in the Arctic region. The Company has created a new facility producing steerable propellers and auxiliary thrust devices. Ship Repair Center “Zvezdochka”, OJSC possesses extensive production facilities and

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integrates a specialized design bureau, which controls the entire process of design and production of the equipment, and acts as a center of technology transfer.

The Company not only produces, but also maintains its product. The enterprise creates the technologies providing the new ice-class vessels with high maneuverability and low operational costs (Moseev, 2016). Today, Ship Repair Center "Zvezdochka", OJSC is the first and only one in Russia manufacturer of propulsive systems (screw propellers, water-jet motors, steerable propellers, etc.) for heavy-duty ice-class vessels to be employed for transportation of liquefied natural gas (LNG) from Yamal deposits.

Currently, on the shore of the Ob River, in the Sabetta port, the project Yamal LNG is being implemented, which plays a critical role in the development of industry and transport infrastructure of the Archangelsk region. Data on local suppliers, their product and services are collected with the support of the "Sozvezdiye" Association. The project involves around 60 shipping, engineering, stevedore companies, producers of inert materials, and work wear suppliers.

Also, experience of the Belfrakht, CJSC, (Archangelsk) should be mentioned as an example of creation of new production facilities in the Arctic, and of replacement of foreign equipment for oil and gas industry. The company launched manufacturing of sealed containers for drilling slurry, which is the first in Russia, on one of the ship repair enterprises of Archangelsk. Earlier, oil-service companies operating in the Arctic region of the Russian Federation had to lease these containers from foreign suppliers. Belfrakht, CJSC developed all necessary design documents, established a testing system for the containers, arranged maintenance and repair, and introduced international safety standards. The main advantage of the slurry containers made by Belfrakht is their applicability at minus 40^0C, which is particularly topical for a winter period on Prirazlomnaya platform (Zabello, 2016).

It should be recognized that the basic measures taken by the Ministry of Energy of the Russian Federation on import substitution are primarily focused on oil and gas engineering and the drilling segment of oil service, which is expected to be fit with domestic high-technology equipment by 2018. The situation in the geophysical segment of oil service looks less optimistic.

It is evident that sanctions on delivery of technologies and equipment create obstacles for geophysical research within major projects, while financial and economic risks pose the most serious threat to small and medium suppliers. Such companies, which are in most cases Russian ones, provide services to small and medium extracting enterprises. Reduced customer's income, restricted credit, growing interest rates, and a rise in price for import equipment lead to reduced scope of geophysical works on new licensed sections (Katysheva, 2015).

Let us consider in detail the problems and prospects for development of seismic exploration activities under the sanctions and against the background of considerable oil price abatement.

Seismic exploration activities represent the basic method of geophysics and allow for estimation of the earth's depth structure and probable hydrocarbon deposits based on dynamic interpretation of reflected signal anomalies. Alongside with widely applied seismic exploration methods 2D and 3D, over the recent years, the broadband seismic methods have developed rapidly, which informative characteristics are much better, with comparable cost of work.

Today, the broadband seismic methods are developed by foreign companies only: CGS ("Broadseis" technology), PGS ("GeoStreamer" technology), Sercel ("Sentiel" technology), Western Geco

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("Izometrix" technology). Of the said technologies, "GeoStreamer" is the obvious leader in broadband offshore seismic exploration both in terms of offshore output, and geology research results achieved. Because of economic sanctions, the said companies have left the Russian market (Ampilov, 2015).

Russian service companies can employ none of the listed technologies, while the primary customers (Gazprom, OJSC, Rosneft, OJSC) do not involve employment of the newest technologies under tender conditions, focusing on minimal cost of works. Furthermore, it should be stressed that the Russian offshore geophysical companies, MAGE, OJSC, DMNG, OJSC, SMNG, OJSC, are not equipped with specialized vessels to conduct 3D seismic exploration. As a result, the 3D seismic exploration activities currently carried out on the Russian shelf have fallen behind the world technologies more than by 15 years (Ampilov, 2016). This means that high-technology 3D activities can be carried out by foreign contractor only.

The imposed sanctions prevent most of foreign contractor companies from working as before. Serious currency risks arising nowadays also should be taken into consideration, since agreements by and between foreign contractors and Russian companies are made in rubles, while contractors incur expenses in dollars or euro, with final payment made upon completion of the entire project.

However, it should be stressed that import substitution in geophysical oil service is associated with a number of serious economic problems. Against the background of decline in exploration works, the Vertically Integrated Oil Company has reduced orders for geophysical research, and the contracts concluded are of discriminative nature as to oil-service contractors. The VIOC allows for a payment grace period for the works performed up to 120 days and more, and from time to time reduces contract service prices by 10-15% (Andrianov, 2015). Given a considerable rise in prices for import materials and equipment, the said circumstances make oil service enterprises unprofitable. Because of growing interest rates, service companies cannot raise credit either. Ultimately, even the largest market players now experience considerable financial difficulties, which fact almost deprives them of the possibility to develop technologies. Upon expanding economic sanctions and cessation of deliveries of a number of kinds of equipment to Russia, the national oil services will not be able to cover all domestic market needs, which will inevitably bring to decline in hydrocarbon production.

However, it should be mentioned that there are exploration companies in Russia paying special attention to the issues of import substitution. In particular, Marine Arctic Geological Expedition, OJSC (MAGE, OJSC) carries out the following primary activities in this area:

1. Purchase and commissioning of a wide range of domestic geophysical hardware systems. Thus, the company uses the system for high-resolution seismic exploration made by the C Technology company (Gelendzhik), seismic SPs of Puls LLC (Gelendzhik), bottom stations for seismic exploration of Morgeokompleks LLC (Murmansk), gravimeters of the Elektropribor Concern (Saint Petersburg), non-explosive pulse electromagnetic seismic vibrators of Eniseigeofisika OJSC (Kazanin, 2015).

2. Development of proprietary new technologies to perform geological and geophysical works under the conditions of the Arctic shelf. In particular, the company has created and integrated in the process of exploration works the technology of under-ice seismic exploration designed for conducting research in the central part of the Arctic Ocean. The technology is patented by the company. Thanks to this technology, in August of 2014, the North Pole was crossed, with geophysical work package done. The

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research conducted let make stronger the Russia's arguments justifying the external boundary of the continental shelf in the pending application.

3. Design and participation in the development of new equipment:

- MAGE, OJSC has developed, manufactured and launched the overboard ice guard designed for seismic exploration in severe ice conditions;

- Together with Morgeokompleks, OJSC the company is working on creation of a system based on floating seismic modules to carry out exploration in severe ice condition with short seismic cable;

- A new geophysical vessel specially equipped for carrying out geological survey for oils and gas on the Arctic shelf has been commissioned.

Therefore, MAGE maintains a proactive import-substitution policy.

4. Conclusions

In summary, it can be concluded that:

- it is viable to localize manufacture of sophisticated large-size equipment for the development of oil and gas deposits in the Arctic region in close proximity to the development sites. Considerable transport risks and high expenses for delivery of cargo to the Arctic region (reaching up to 35% in the cost of supply of equipment) can be decreased significantly due to localization of production on the enterprises that have access to the Arctic region and can ship cargo to sea vessels;

- over time, availability of production facilities and maintenance bases in proximity to the Arctic shelf will allow for multiplicative economic effect;

- Archangelsk, Murmansk and Severodvinsk located in close proximity to the Arctic shelf and having access to the northern seas are important industrial, transport and logistics, and scientific hubs in the Arctic region of the Russian Federation, however, today, their potential has been achieved not in full;

- involvement of northern engineering, geological survey, and scientific and research enterprises in production of goods and services for the oil and gas sector, as well as localization of production of oil and gas equipment in the Arctic region of the Russian Federation may encourage a radically new industrial, infrastructure and social development of the northern areas and start of large-scale development of hydrocarbon depositions on the Arctic shelf of Russia.

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