

Development of Oil and Gas Production and Transportation Infrastructure of Russian West Arctic Offshore Regions

V. I. Pavlenko, E. K. Glukhareva

Arctic Research Center, Russian Academy of Sciences
Moscow, Russia

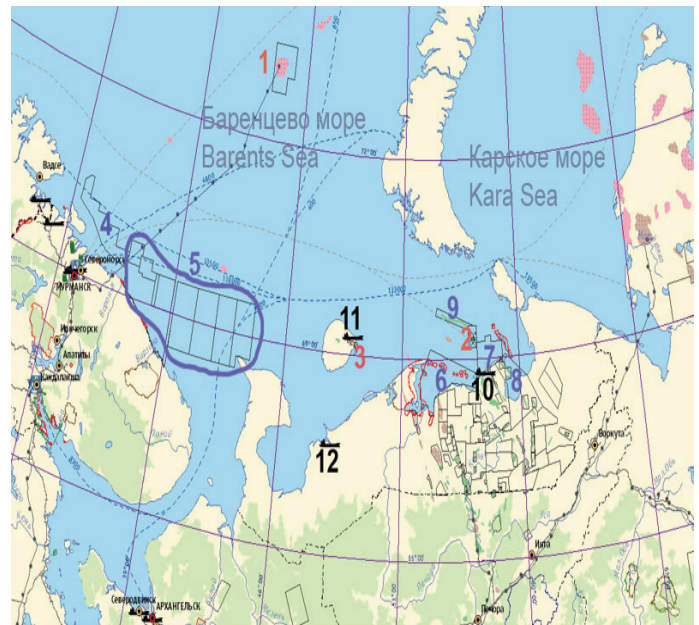
ABSTRACT

West Arctic regions play a key role in Russian hydrocarbon resources production and transportation activity. The spatial structure of hydrocarbon's deposits in offshore areas of the Arctic shelf of the Barents Sea and Pechora Sea which will be developing in near future assumes gradual development of new deposits and expansion of infrastructure system of resources delivery. The projection of development of hi-tech complexes of industrial infrastructure on deposits service is given. The key role of the coastal complexes which will be the base for future oil and gas exploitation in Russian Arctic regions are pointed out. The authors provide the description and technical parameters of some projects which are planning to be implemented in these regions in the near future. The results of the study can be used for the realization of offshore resources management plans as a part of territorial planning of Russian North-West region and also for the future development of Russian and international joint-venture projects on resources exploitation and transportation in Arctic.

KEY WORDS: Oil and gas production and transportation; Russian West Arctic infrastructure development; coastal and offshore complexes; perspective projects.

INTRODUCTION

The expected volumes of oil extraction on the Russian shelf can equal up to 95 million tons and gas up to 320 billion m³ in 2020. Among the Russian West Arctic Offshore regions two most significant with commercial oil and gas reserves have been singled out for exploration (The opening, 2005). The first is the Pechora Sea oil-bearing province which includes: the Varandey, the Dolginskoe, the Medynskoe and large-scale Prirazlomnoe oil fields; the Severo-Gulyaevskoe and Peschanoozerskoe oil and gas condensate fields; and the Pomorskoe gas condensate field (fig.1). According to estimations of Nenets Autonomous Area (NAO) Administration the annual extraction of oil in NAO can reach 25 million tons in 2010 and 30 million tons in 2015. The second is the central Barents Sea gas-bearing region which encloses the Ludlovskoe, Severo-Kil'dinskoe and Murmanskoe gas fields, as well as the Ledovoe and the Shtokman gas condensate fields (Fig.1). Ultimate potential gas resources in the Barents Sea amount to 21, 6 trillion m³ (Belonin and Prishchepa, 2006). In terms of production and transportation development the most promising field in the Barents Sea is the Shtokman gas condensate field. However there is still no commercial production of hydrocarbons in West Arctic offshore regions. Transportation is oriented mainly for export. A description of the infrastructure system for implementing of large projects in these regions is presented in the paper.



1 - Shtokman gas condensate field; 2 - Prirazlomnoe oil field; 3- Peschanoozerskoe oil and gas condensate field; 4- Rybachinskiy block (hydrocarbons); 5 - Kolskiy (1-6) blocks (hydrocarbons); 6 - Block Western part of the Pechora Sea (hydrocarbons); 7 - Block Medynsko-Varandey part of the Barents Sea floor (oil and gas); 8 - Block Varandey-Adzvin'skaya structure (oil); 9 - Dolginskiy block (hydrocarbons); 10 - Varandey terminal; 11 - Kolguev terminal; 12 - Indiga terminal.

Fig. Oil and Gas Fields and Terminals in Russian West Arctic.

OFFSHORE AND COASTAL PROJECTS IN WEST ARCTIC

The Shtokman Field Challenges

The Shtokman deposit is one of the World's largest. Its stocks are estimated about 3, 8 trillion m³ of natural gas and 37 million tons of a gas condensate. The annual extraction on the first stage of the project can make 23, 7 billion m³ of gas. It is planning to separate gas for production of 7, 5 tons of liquefied natural gas (LNG) and transporting of 11 billion m³ of gas by "Nord Stream" pipeline (Bambuliak and Frantsen, 2009). It is important to provide interactions between the gas companies by working out of logistical schemes of LNG transportation. Definition of optimum technical parameters of bulk carriers and other