- facilities suitable not only for well-drilling, but also for production and storage of oil prior to its transportation to refinery;
- direct shipment of oil tankers.

Disadvantages of gravity and floating installations:

- lack of space for equipment;
- dependence on climatic conditions;
- high price;
- need for personnel presence on the platform for a long time.

All offshore structures must be decommissioned when the production life time arrives to the end. The offshore structure must be removed with a floating unit, in theory, it can be reused by unplugging the rivers and moving to another field.

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THE HISTORY OF SHTOKMAN FIELD DEVELOPMENT

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The Shtokman field is one of the world's largest gas fields and is located in the Russian sector of the Barents Sea, 550 km from the coast The field was discovered in 1981. Shtokman reserves are estimated at 3.9 trillion cubic metres of gas and about 56 million tons of gas condensate. The licence for the development of the field is held by Gazprom neft shelf. The department responsible for the development of offshore fields was established at Gazprom in 1993.

The Government Commission for Energy approved the year 2016 as the year to begin production at the Shtokman field. It is planned that in the second quarter of 2016 the first Shtokman gas will enter the unified gas supply system in Russia. Shtokman gas will also be a resource base for the supply of gas along the Nord Stream pipeline to Western Europe and the production of Russian liquefied natural gas.

In 2008, in order to implement the Shtokman project, Gazprom, Total (France) and StatoilHydro (Norway) created the joint venture Shtokman Development AG. In the capital of the company, which will be the owner of the infrastructure of the first phase of the Shtokman project, 51% belongs to Gazprom, 25% to the French Total and 24% to the Norwegian Statoil. The company's head office is in Zug (Switzerland). There are branches in Moscow, Murmansk and the village of Teriberka in the Murmansk Region.

The first development phase of the Shtokman project will last for 25 years starting from time the field is put into operation. It will produce 23.7 billion cubic metres of gas, and will then be followed by a second phase with an estimated capacity of 47.4 billion cubic metres. During the third phase, the production volume will be 71.1 billion cubic metres of gas per year.

«If the project is not implemented, Russia will face a shortfall of more than 100 billion US dollars», - said the executive director of the project operator Shtokman Development AG, Alexei Zagorovsky. The investment decision will be made by shareholders in March 2012, when tax clarity is introduced. The President of Statoil in Russia Jan Helge Skogen believes that the project needs concessions on export duties and mineral extraction taxes. Sergei Shatalov, the Deputy Finance Minister of Russia believes that the tax regime for the Shtokman gas condensate field may be developed in a similar manner to the experience of the Yamal LNG project. «If we consider the Shtokman field, there should be something similar: tax breaks on MET (mineral extraction tax) and probably zero export duties on the gas that is produced¼», said Sergei Shatalov. The Russian Ministry of Finance will examine the feasibility study of the need for tax preferences.

In 2012, a Gazprom subsidiary - Gazprom Dobycha Shelf plans to begin the construction of coastal infrastructure for the Shtokman field in the village of Teriberka in the Murmansk Region. There are plans to build a port and an LNG plant. The coastal infrastructure facilities will be built by 2017. In order to accommodate staff at the operational stage of the project, a field camp will be built in Teriberka able to house up to 1000 people. At the time of construction the number of jobs in the Teriberka area will increase to 15,000-18,000. At the end of 2011, public hearings were held in Teriberka on the construction project and design documentation was approved by environmentalists and local residents. Several thousand specialists will be employed at the operation stage of the port and the LNG plant. Up to 13,000 people will be involved in the first phase of the development of the Shtokman field.

According to Gazprom materials, the Shtokman reserves economically justify the building of new infrastructure for the supply of «blue fuel» to the unified gas supply system of Russia and the construction of a liquefied natural gas (LNG) plant, as well as a tanker fleet to transport the LNG to export markets. According to Sovcomflot, the company which Gazprom agreed to work with on a logistics and tanker fleet configuration project, the Shtokman project may require 20 tankers worth a total of $4 billion.

In developing the field, Shtokman Development AG is counting on international experience and innovative Russian solutions for work on the Arctic shelf. Given that the project term is more than 50 years, modern technology is being used for the construction of offshore facilities, in order to ensure that equipment works efficiently and can be

upgraded during the term of the project. In order to develop the field, the first semi-submersible drilling rigs, Polar Star and Northern Lights, have been constructed and delivered to the customer - Gazflot LLC. These sixth generation platforms are able to work in brash, first-year ice up to 0.7 m thick.

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ASSESSMENT OF RESERVOIR TEMPERATURES OF TARYS AND CHOYGAN GEOTHERMAL SYSTEMS (EASTERN TUVA)

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The territory of the eastern Tuva refers to the continuation of the Baikal seismogenic Rift Zone and has significant reserves of geothermal resources. These hydrotherms formed due to the numerous deep faults and the presence of faults in rocks. The thermal and sub-thermal springs manifest by the high temperatures and active depth heat and mass transfer in the bowels of the Eastern Tuva [3].

One of the interesting aspects of the geothermal system study is to determine the subsurface reservoir temperatures, as one of the factors in the groundwater formation. Geothermometers are the most important and universal geochemical tool for the evaluation of reservoir temperatures. The first geothermometers developed by Bodvarsson and Palmason in 1961 were exclusively empirical and based on the link between the silicon content and the contents of some the cations with the reservoir temperature [2]. Using geothermometers involves the establishment of the chemical equilibrium in the geothermal system between a mineral and fluid

In this regard, the aim is to study the thermal conditions of the geothermal system in the Eastern Tuva.

The study of thermal waters in the Baikal Rift Zone was conducted by Lomonosov I.S. (1974), Lisak S.V. (1976), Polyak B.G. (1992), Zaman L.V. (2000), Plyusnin A.M. (2000), Golubev V.A. (2007), Shvartsev S.L. (2015) et al. Badminov P.S., Orgilyanov A.I., Ganchimeg D. (2011) studied subsurface temperature in this territory. Rychkova K.M., Duchkov A.D., Lebedev V.I. and Kamensky I.L. etc. (2007, 2010) carried out the assessment of the heat flow in the Tyva region. In Polyak's works (1994) isotopic composition, heat, and mass transfer of fluids for the Baikal Rift Zone were recorded.

The thermal springs of natural spa complexes Choygan and Tarys were selected for the geothermometric evaluation of the Eastern Tuva geothermal system. Choygan is located in the East Sayan in the north-east of the Republic of Tyva on the border with Buryatia. This is a reservoir of carbonic cold and thermal waters. Groundwater is discharged in the form of springs with the temperature on the surface of up to 39 °C, but the deep water temperature is much higher.