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# FEATURES OF ACCOUNTING FOR LOGISTICS COSTS IN OIL COMPANIES IN THE ARCTIC

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#### Abstract

The oil and gas complex of the Russian Federation is a priority industry that provides a significant contribution to the country's economy. The largest share of Russian exports are oil and gas. The oil and gas complex of the Russian Federation provides the main revenues of foreign exchange earnings of our country. Thus, the development of this industry depends on world oil prices. Due to the fall in oil prices, the size of investments is reduced, which leads to the deterioration of fixed assets, the reduction of operated wells. In this regard, it is necessary to effectively manage costs by optimizing the accounting and control system. Thus, the Arctic zone of Russia is a huge potential for Russia's development. Logistics system in the oil and gas industry is an adaptive feedback system, within which certain logistics operations are performed, consisting of several elements of subsystems and having developed links with the external environment and strong, stable links between the elements of the system. The peculiarity of logistics systems at oil-producing enterprises is that a significant share of costs are the costs of exploration of a specific territory, processing and evaluation of the results obtained, drilling of appraisal wells, design work, construction of a shift camp and production infrastructure. As a result, industrial development of hydrocarbon deposits takes 15-20% of all costs, the cost of environmental measures-15%.

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Keywords: Logistics costs, transportation, oil and gas industry, Arctic, national project.



## 1. Introduction

The oil and gas complex of the Russian Federation is a priority industry providing a significant contribution to the economy of the country. The largest share of Russian exports is oil and gas. The oil and gas complex of the Russian Federation provides the main flow of foreign exchange revenues of our country. Thus, the development of this industry depends on world oil prices.

It should be noted that at present the theoretical approach to accounting for logistics costs in the oil companies of the Arctic zone has not yet been fully formed. Most studies on accounting for logistics costs are limited to identifying and classifying possible cost elements. Regarding the assessment of logistics costs in the Arctic, different points of view are found in the scientific literature. In particular, I would like to highlight the significant work in this area published recently by the following scientists (Ahmad, Rezaei, Tavasszy, & de Brito, 2016; Bahree, 2006; Chiung-Lin, & Pei-Yu, 2016; Giri, & Sarker, 2017; Göbl, & Froschmayer, 2011; Gu, & Dong, 2016; Jamali, Karam, Yin, & Soundararajan, 2017; Liu, Huo, Liu, & Zhao, 2015; Maley, 2015; Tjader, May, Shang, & Vargas, 2014; Wright, Forster, & Beale, 2017).

## 2. Problem Statement

Due to the fall in oil prices, the size of investments is decreasing, which leads to wear of fixed assets, reduction of operating wells. Therefore, it is necessary to manage costs effectively by optimizing the accounting and control system. The aim of the research is to study the features of accounting for logistics costs in organizations of the oil and gas industry in the Arctic zone.

#### 3. Research Questions

The Arctic zone of the Russian Federation is more than 20% of the territory of Russia. Currently 95% of gas, 75% of oil, most of nickel, tin, platinum, gold and diamonds are produced in the Far North regions. One third of the Arctic Ocean is occupied by the shelf of Russia's Arctic seas. The huge reserves of natural resources (gas, oil, non-ferrous metals) are concentrated in the coastal zone and offshore of these seas. The oil and gas potential is estimated at more than 100 billion tons - 30% of the world's oil and gas reserves. Today, Russia is one of the three leaders in hydrocarbon production.

In the Arctic zone, the volume of gas production is 83% of all production. Oil production in the Arctic has reached 17.6% of the national total, and this figure is projected to reach 26% by 2035 (Figure 01).



Source: authors.



Development of oil and gas fields in the Arctic is associated with high costs and a high level of risk. When developing Arctic oil and gas resources, companies face a number of problems related to the harsh climate and lack of infrastructure.

#### 4. Purpose of the Study

A logistics system in the oil and gas industry is an adaptable feedback system within which some logistics operations are performed. The system consists of several elements of subsystems and has developed connections with the environment and strong, stable connections between elements of the system.

#### 5. Research Methods

During the writing of the work, such research methods as factor and structural analysis, observation and study of the regulatory framework were used. Let 's highlight the main stages of the flow process movement in the oil and gas company and present them in Figure 02:

- 1. Exploration, engineering and exploration works, field development;
- 2. Oil and gas production;
- 3. Oil and gas processing;
- 4. Transportation to the domestic and foreign market;
- 5. Services.

The feature of logistics systems of oil-producing enterprises is that the significant share of the costs are the costs of exploration of a specific territory, processing and evaluation of the obtained results, drilling of evaluation wells, design works, construction of a working camp and production infrastructure. As a result

the industrial development of hydrocarbons fields occupies 15-20% of all expenses; costs of ecological actions are 15%.



Source: authors.

Figure 02. Flow Movement in the Oil and Gas Company

The process of oil and gas production includes the following stages: maintenance of reservoir pressure; products extraction from wells; oil and gas collection and transportation; complex preparation of oil; fish wastewater treatment; external oil and gas pumping.

The technology features of the oil and gas industry define the structure of cost items that can be classified into three groups:

- Flow rates related to wells operation;
- Oil and gas production costs;
- Costs associated with processing, storage and transportation of oil and gas.

The territory of the Arctic zone of Russia is characterized by a harsh climate, the temperature reaches - 60 C, the average temperature is 30 C, and +3 C in summer. The Arctic is home to a variety of significant mineral resources and other natural resources, and its territory is home to economic and social facilities in

limited areas. The Arctic zone of the Russian Federation is characterized by dispersion of settlement, remoteness and transport inaccessibility, extreme vulnerability and slow recovery of natural ecosystems, and a high proportion of the population of indigenous peoples of the North.

The development of hydrocarbon deposits in the Arctic zone is accompanied by severe climatic conditions, which come with additional logistical costs related to the exploration and development of deposits, as well as oil and gas production.

There is practically no transport infrastructure, including road and rail transport in the Arctic zone. Thus, the development of the Northern Sea Route is necessary. The Arctic transport system should include a complex of maritime and river fleet vehicles, aviation, pipeline, rail and road transport and coastal infrastructure providing transport activities in the Arctic zone.

Development of oil and gas fields in the Arctic is associated with high costs and a high level of risk. When developing Arctic oil and gas resources, companies face a number of problems related to the harsh climate and lack of infrastructure.

The Vankor cluster, which is being developed by LLC RN-Vankor, a subsidiary of NC Rosneft, is not only the Vankor field, since the opening of which 30 years have passed. Currently, the company is actively developing new fields - Tagulsk, Lodochnoe and Suzun.

All standards in the field of industrial safety and environmental protection are met during the construction of the Vankor Cluster field facilities. Permafrost interval during the construction of cluster platform base is covered by special thermal insulating waterproof layer. So, all structures, including the drilling rig and wells, are situated on a sandy "pillow." There is no environmental impact at the sites.

The key to the long history of Vankor and successful work was oil and gas reserves, which have been constantly growing. Here are a few figures: in 1991 the oil reserves of Vankor were estimated at 125 million tons, by 2009 they became 500. Today Vankor is the whole cluster of deposits and it is also an extensive program of geological exploration in the north of the region - in the Arctic zone.

## 6. Findings

Oil production costs are accounted for and calculated under the items presented in Table 01, in accordance with the planning, accounting and calculation of oil and gas production costs.

Cost items	Cost structure	Calculation
1. Expenditures on energy	electricity costs for the drives of pumping	The sum of expenditures on
spent on oil extraction	machines, group drives, electrically driven	energy spent on oil extraction
	centrifugal pump, compressed air and gas used for	is calculated by multiplying
	the compressor method of oil extraction are taken	specific energy consumption
	into account	rates in kWh/t of liquid by the
		volume of liquid production.
		Quotation for 1 kWh/t of the
		electric power consists of
		expenses for payment for
		consumed kilowatt - hours of
		active energy, for rated
		capacity and for maintenance
		and service of the power
		supply network and substation

Table 01. Accounting and calculating the cost of oil production (production costs of oil production)

artificial impact on the formation   and various reagents into the formation to increase oil recovery of the formations are taken into account. These costs are calculated in the formation-pressure maintenance department   water charges, water-injection well depreciation, well amittenance workers' wages, electricity, ele     3. Basic and additional wages of production workers   the basic wages of workers (operators) and engineering employees directly involved in oil and gas production and managed by fisheries are taken into account   electricity, ele     4. Expenditures on social needs   social insurance contributions are taken into account in accordance with the standards established by law     5. Wells depreciation   full recovery costs, which are performed according to the current standards from the cost of ingeci injection and absorption wells are not included in this article) are taken into account     6. Expenditures on collecting and oil transportation   the cost of maintenance and operation of network of of pipelines from the mouth of vells to capacities of the commodity park of the oil-and-gas production department, condensate drain lines, the pump station, networks of gas pipelines, separator installations, group gas installations, booster compressor stations, etc. are considered. In addition, this article contains the cost of oil poses (within the limits of standards) during production and dosing or reagents); Expenses for maintenance and operation of the evelophosition and desating, stahilization and stabilization Cost of reagents used in the process of oil preparation (regardless of the place of introduction and dosing or regars); Expenses for maintenance and operation of these wells and also the expenses connected with collecting, preparation, heat exchangers)	2. Expenditures on	the costs for edge and circle water (gas) injection	They consist of energy costs,
formation   oil recovery of the formations are taken into account. These costs are calculated in the frameworks are calculated in the masic wages of workers (operators) and engineering employees directly involved in oil and workers   well depreciation, well maintenance worker's wages, of workers (operators) and engineering employees directly involved in oil and scored in the account in account and monitor wells (depreciation contributions from the cost of oil, gas, estimation, observation and monitor wells (depreciation contributions from the cost of injection and absorption wells are not included in this articly are taken into account     6. Expenditures on colic distribution of of oil pipelines from the mouth of wells to capacities of the cost of maintenance and operation of network of oil pipelines from the mouth of wells to capacities of the cost of all bases (within the limits of standards) during production and storage in commodity takes, as well as during pumping through oil pipelines beyond commodity oil takes     7. Gas collection and transportation costs   Cost of reagents used in the process of oil coses (within the limits of standards) during production and disting of reagents); Expenses for maintenance and operation of processing costs     8.Oil processing costs   Cost of reagents used in the process of oil coses (within the limits of langes of the place of introduction and assign of reagents); Expenses for maintenance and operation of processing plants (thermochemical, electrodeposition and desalting, stabilization and orbit process for maintenance and operation of these wells and also the expenses connected with collecting, preparat	artificial impact on the	and various reagents into the formation to increase	water charges, water-injection
account     These costs are calculated in the formation-pressure maintenance department     maintenance workers' wages, electricity, etc       3. Basic and additional workers     the basic wages of workers (operators) and engineering employees directly involved in oil and gas production and managed by fisheries are taken into account     deciricity, etc       4. Expenditures on social needs     social insurance contributions are taken into account in account in accordance with the standards       5. Wells depreciation     full recovery costs, which are performed according the cost of maintenance and operation of network of the current standards from the cost of injection and absorption wells are not included in this article) are taken into account       6. Expenditures on collecting and oil transportation     the cost of maintenance and operation of network of oil pipelines from the mouth of vells to capacities of the cost of gas pipelines, separator production department, condensate drain lines, the pump station, networks of gas pipelines, separator and storage in commodity tarks, as well as during pumping through oil pipelines beyond commodity oil tanks       7. Gas collection and transportation costs     Cost of reagents used in the process of oil preparation (regardless of the place of introduction and dosing of reagents); Expenses for maintenance and operation of preparation (regardless of the place of introduction and dosing of reagents); Expenses lor maintenance and operation of preparation (regardless of the place of introduction and stabilization cost of oil process losses during its preparation (within the limits of loss standards); Depreciation charges from the cost of the absorbing wells, expenses for maintenance and operation	formation	oil recovery of the formations are taken into	well depreciation, well
Image: solution pressure maintenance department     electricity, etc       3. Basic and additional wags of production and managed by fisheries are taken into account and managed by fisheries are taken into account in accordance with the standards established by law     .       4. Expenditures on social assumance contributions are taken into account in accordance with the standards established by law     .       5. Wells depreciation     full recovery costs, which are performed according to the current standards from the cost of oil, gas, estimation, observation and monitor wells (depreciation contributions from the cost of injection and absorption wells are not included in this article) are taken into account       6. Expenditures on collecting and oil of oil pipelines from the mouth of wells to capacities of the commodity park of the oil-and-gas production department, condensate drain lines, the pump station, networks of gas pipelines, separator installations, group gas installations, booster compressor stations, elc. are considered. In addition, this article contains the cost of oil losses (within the limits of standards) during production and storage in commodity tanks, as well as during pumping through oil pipelines beyond commodity oil taks       7. Gas collection and transportation (regardless of the place of introduction and dising of reagents); Expenses for maintenance and operation of processing plants (thermochemical, electrodeposition and desalting, stabilization and orber process loss and ards); Expenses for maintenance exchangers) and other process loss estandards); Expenses for maintenance edo partenion of these wells and also the expenses connected with collecting, preparation (within the limits of loss standards);       9. Expenses for productio		account. These costs are calculated in the	maintenance workers' wages,
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10. Expenses for	development		
	10. Expenses for		
maintenance and operation	maintenance and operation		
of wells and equipment	of wells and equipment		
11. Shop expenses Expenses for the labor of shop staff, expenses for	11. Shop expenses	Expenses for the labor of shop staff, expenses for	
maintenance and repair of buildings, structures.	1 . 1	maintenance and repair of buildings. structures	
depreciation deductions from the cost of buildings.		depreciation deductions from the cost of buildings,	

	structures and other fixed assets, labor protection			
	expenses.			
12. General production				
expenses				
13. Other production costs				
Total production cost of oil and gas				
14. Business expenses	The costs associated with the transportation of			
	crude oil from stock tanks, oil and gas management			
	to a main pipeline or tanks of the buyer of crude oil			
	and transportation of oil from the stock tanks to the			
	loading point of the overpass, where produced oil			
	loaded in tank cars or oil tankers.			
Total cost of oil and gas				

Source: authors.

There are no items in the costing items item, such as "material costs"; "returnable waste"; "reject losses". A feature of the process of the oil and gas industry is that there are no semi-finished products and work in progress. That is, all expenses are written off in full for the cost of finished products. All costs are distributed between oil and gas in the oil and gas industry. The specifics of oil and gas production technology make it necessary to use a simple costing method, the costs of production are taken into account for one shift. Oil wells are equipped with ground and underground equipment, the operation of which is expensive, so the cost accounting should be carried out separately on ground and underground equipment.

### 7. Conclusion

Based on the analysis of specific features of cost accounting in the oil and gas industry, we can identify following areas for improving the production efficiency and reducing costs:

- Use of energy-saving equipment;
- Modernization of the equipment;
- Implementation of low-waste and non-waste technological processes;
- Complex processing of raw materials;
- Ecology-oriented development.

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