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Compensation for oil pollution damage

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Abstract. The commitment of national industries to traditional energy sources, as well as constantly growing energy demand combined with adverse environmental impact of petroleum production and transportation urge to establish and maintain an appropriate legal and administrative framework for oil pollution damage compensation. The article considers management strategies for petroleum companies that embrace not only production benefits but also environmental issues.

1. Introduction

Dependence of many economies on the consumption of traditional energy sources, as well as the limited use of alternative energy sources, makes it necessary to improve hydrocarbon production efficiency both in terms of volume of extraction and environmental impact reduction. The fulfilment of these vital conditions is complicated by fast-developing technologies applied in petroleum industries, which in its turn leads to the increase in natural resource production and technogenic environmental impact. For example, the number of accidental oil spills and leaks annually increases not even in proportion to the production but significantly faster. According to NPO "Centre of Ecology FEC", petroleum product losses make up 3.5-4.5% during production and transportation stages in Russia; according to the current level of production it is nearly 18-23 million tons of oil losses or 4.2-17.2 billion dollars per year [1]. However, this data is not accurate as it does not take into account environmental damage costs. Thus, it is necessary to develop and establish an appropriate legal and administrative framework for oil pollution damage compensation, suitable not only for petroleum companies but also corresponding environmental organizations.

The necessity of taking into account the ecological effects significantly influences production engineering. It becomes absolutely apparent in a case of oil production and transportation in order to secure stable supply of natural resources as the basis of national economy. In this regard, it is necessary to emphasize a significant negative impact produced by petroleum industry on the atmosphere, water and forest resources (production companies use approximately 2000 million cubic meters of fresh water including 701.5 million cubic meters in crude oil and gas production), flora and fauna (oil fields are one of the main sources of forest fires resulting in the death of 20-40% of trees in tundra forests) [2] and etc. The diversity of the environmental impact effects makes it necessary to differentiate the activities and responsibilities of petroleum companies. The task is complicated as various business entities having different rights and interests in the field of the environmental management are usually involved in legal and administrative framework development.



The development of legal and administrative framework for oil pollution damage compensation involves regulation of allocation procedure and use of economic resources with regard to environmental purposes and industry structure changes, as well as national economy as a whole. Thus, this brings up an additional structural segment – environmental. The above-mentioned tendencies are rather complex and interconnected. They are referred not only to the industry in question but to all sectors of the economy defining such important socio-economic indicators as income levels of people, their health and work capacity, life expectancy, and etc. It is supposed that the compensation for the environmental damage is carried out both by oil production and transportation companies and corresponding environmental organizations.

Therefore, the aim of the study is to elaborate the approaches to develop legal and administrative framework for oil pollution damage compensation, taking into account environmental segment of the national economy.

2. Theoretical Bases

The introduction of the environmental factor into petroleum industry has a harmful effect as it is required to enhance the corresponding production and transport technologies (core activity) and maintain environment (imputed; and in the absence of effective stimuli – secondary activity). The importance and the exclusive role of each component in production processes indicate the formation of the integrated system "production-environment" (with possible prevalence of the second component). It is facilitated by the development of appropriate legal framework, which defines the restrictions and is directly related both to the regulative sphere (for example, the federal laws "Subsoil Law", "Environmental Protection Act" and others) and standard of living as a whole (e.g., Civil, Tax, Land Codes, and etc.). Such a combination of these spheres is aimed to ensure continuous and effective production engineering in terms of needs satisfaction and environmental impact reduction.

The current administrative limitations encourage enterprises to adapt to new conditions determining the methods of compliance with introduced regulations and rules.

The development of corresponding legal and administrative framework can be initiated by the following entities (depending on the scale and significance of the problem), allowing the integration of their efforts:

- the state (for example, within the framework of the federal target program "Measures for reduction of risks and mitigation of consequences of the emergency situations of natural and technogenic character in Russia", it is planned to construct landfill for safe recycling of oil toxic wastes in the site of the Samotlor field (Yugra) [3];
- the administrative region (in Tomsk Oblast the use of peat sorbent in emergency oil spill response is discussed[4]);
- the company itself (for example, in 2012 JSC "Tatneft" spent 6 billion rubles on the implementation of measures to improve the environmental safety of production facilities [5].

However, the list of entities can be continued. Joining efforts of environmental organizations to find the ways and develop the methods in order to ensure the compliance with environmental requirements results in business isolation and at the same time indicates the formation of ecological segment. Its peculiar feature is the combination of the state priorities and companies' interests (both the segment itself and oil producing companies). This partnership has following advantages. Producer-enterprises are able to exclude the non-core sector using the services of environmental segment which provides standard and custom services. Environmental organizations consider the ways to minimize the anthropogenic pressure. As they are not burdened by other production activity, they are interested in getting breakthrough innovations. The result is the development of new economic relations, generation of new ideas and possibility of their rapid dissemination, improvement of customer-enterprises efficiency. For example, the company "Composite" which produces universal technical materials and means for the oil spill response, is a partner of JSC "Lukoil"; JSC "Transneft"; Sakhalin - I, Sakhalin - II; JSC "NK Rosneft"; "TNK-BP Holding"; sea and river ports, and steamship lines; Russian Emergency Situations Ministrydivisions [6].

The significance of the environmental segment for oil production is confirmed by the following data: the world oil recovery equipment market totalled 300 million Euros, more than half of it falls on three firms – Finnish "Lamor", Danish "Roclean-Desmi" and British "Vicoma". The sorbent market in Russia is estimated as 1.5 billion dollars [7]. These figures do not take into account all the variety of activities. In this regard, it is appropriate to structure the environmental segment by different features:

1. depending on the profile of companies' activity:
 - materials production,
 - equipment/ technologies,
 - services;
2. depending on partners:
 - with the state participation,
 - with the administrative region participation,
 - with the special trading companies participation;
3. depending on the level of products/ services compliance to existing requirements:
 - relevant,
 - forward-looking;
4. depending on the administrative geography:
 - local,
 - regional,
 - national;
5. depending on temporal aims:
 - related to the elimination of accumulated damage,
 - related to the current activity,
 - related to preventive activities.

The development of legal and administrative framework for oil pollution damage compensation is related to the distribution and redistribution of entity resources, including oil production companies (for example, in the above-mentioned companies, expenditures on the environmental protection are planned to be 90 billion rubles in 2014-2016: more than 40 billion rubles are planned on the construction of environmental infrastructure and about 50 billion rubles – other environmental protection measures including the elimination of accumulated environmental damage [8]. Information exchange among the industries and the integration of efforts contribute to solving environmental problems. Thus, CJSC Scientific-Technical Company "ModulNefteGasComplect" unites the design institute "Research and Design Institute ONGM", the Oilfield equipment manufacture and assembly plant.

The criteria on the environment damage mitigation are definitely set by the state that is authorized with the unique (compared to other entities) powers and the motivation tools. However, one can hardly exclude the initiative activity of the companies that develop new and unique approaches. It is these actions that indicate a progressive approach to the environmental management and awareness of the importance of environmental issues. The activity towards the best compliance to the requirements or "knowledge of the future" creates the conditions to disseminate the best practices and, as a consequence, change petroleum company regulation, including the state level. For example, since 2010 JSC "NK Rosneft" has been executing the corporate program to eliminate the accumulated environmental damage, which has no analogues in Russia (1.5 thousand hectares of polluted and degraded lands were recultivated, more than 2 million cubic meters of drilling and oil sludge waste were recycled). The company has sent a proposal to the Russian Ministry of Nature Management to include this program (for the period 2014-2020) in to the draft federal target program "The liquidation of accumulated environmental damage in 2014-2025" [9]. It indicates the development of legal and administrative framework from the micro-level (enterprise) to the macro-level (state). There is also room for possible cooperation between the state and the special companies at the stage of developing new approaches to minimize the negative production impacts. Thus, OJSC "Poliglin" has developed a

polymer-clay sorbents for water purification and disinfection based on the results of the RF Ministry Grants Program "Development of Scientific Potential of Higher Education", Ministry of Education program of the Russian Federation and the American Foundation for civil Research and Development "Fundamental studies and higher education", the Foundation for Assistance to Small Innovative enterprises in Science and technology [9-12].

3. Results and discussion

The important role of petroleum industry in maintaining the relevant dynamics of the national economy is out of question, however, the significant environmental damage requires a change in the existing approaches to the production management. The case in point is the introduction of the environmental component in to petroleum company management. The first step is the adaption and consolidation of standards and rules initiated by the state, which would regulate petroleum company management in terms of combination of economic and environmental components. Therefore, activity priorities are defined, the implementation of which is based either on the introduction of environmental component in the company structure, or cooperation with the companies providing services to eliminate the negative environmental effects (environmental segment).

A leading role in environmental segment development belongs to the state which is responsible for initiating corresponding administrative and legal framework aimed at performance control and entity motivations. Moreover, the work of corresponding environmental organizations is more defined, since the development of techniques to minimize environmental impact is their core business. They have guaranteed the market for their services (in case of providing services of high quality). The development of legal and administrative framework for oil pollution damage compensation can be initiated by local authorities and oil production/transport companies with the possibility to apply the same regulations at the macro-level in terms of not only best practice exchange but also laws, regulations and targeted programs.

Due to a great variety of adverse environmental effects caused by oil production and transport and the need for an integrated approach to environmental issues involving entities at all levels of management, the environmental segment can be structured according to a wide range of criteria.

References

- [1] Russian oil tears: the pipeline accident gives rise a cancer [web-site] URL: <http://top.rbc.ru/economics/10/04/2012/645532.shtml>
- [2] Golubchikov S Oil production ecology [web-site] URL: http://www.ng.ru/energy/2006-12-12/11_eco.html
- [3] Drilling slurries [web-site] URL: <http://www.rg.ru/2012/07/26/reg-urfo/poligon.html>
- [4] Akasaki I, Sota S, Sakai H, Tanaka T, Koike M and Amano H 1996 *Electron. Lett.* **32** 1105
- [5] Rozhkova D S 2014 Industrial management of peat sorbent production in Tomsk region *XVIII International Scientific Symposium in Honour of Academician M.A. Usov: Problems of Geology and Subsurface Development (7–11 April 2014)* (Tomsk: TPU Press) **7** 1–4
- [6] Sultanova G 2013 Ecology and oil production *Oil and Gas Vertical* **17** 84–86
- [7] Oil skimmers [web-site] URL: http://m.expert.ru/countries/2005/01/01co-oil_56136/
- [8] Rosneft: Health and safety environment [web-site] URL: <http://www.rosneft.ru/docs/report/2013/care/ecology.html>
- [9] OJSC "Poliglin" [web-site] URL: <http://www.rvf.ru/upload/files/2011/exposition/polyglin-2011-rus.pdf>
- [10] Tsibulnikova M R, Pogharnitskaya O V and Strelnikova A B 2015 Designing economic and legal mechanism of land management in oil and gas companies *IOP Conf. Ser.: Earth Environ. Sci.* **24** 012032
- [11] Sharf I V, Malanina V A and Kamynina L A 2014 Features of the marketing strategy of oil and gas companies in exploration drilling *IOP Conf. Ser.: Earth Environ. Sci.* **21** 1–6

- [12] Sizov A V, Tretjyakov K N, Boyarko G Y and Shenderova I V 2015 Liability of the supervisor under petroleum drilling contract *IOP Conf. Ser.: Earth Environ. Sci.* **24** 012029