

EFFECTIVE MANAGEMENT OF ENVIRONMENTAL RISKS IN THE OIL AND GAS INDUSTRY

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Summary. The application of the corporate governance system of transnational oil and gas companies and the formation of a positive rating are based on comprehensive risk management against the backdrop of rapid technological development in the modern world. Risk factors that form the investment attractiveness rating of territories, especially environmental risks are not always taken into account while assessing their impact. From an economic point of view, managing environmental risks of projects is more effective if they are implemented at earlier stages of project implementation and organization. Unfortunately, due attention is not paid to calculating lost environmental benefits. Active risk management should be systemic but currently more attention is paid to financial risks. At the same time, recent discussions of safety declarations for hazardous industrial facilities practically allow creating a system of detailed analysis of exposure to environmental risks during the entire production period at the pre-investment, investment and operational stages of oil field development and industry enterprises. As a rule, environmental risks are not taken into account in feasibility study documentations, and managerial documents substantiating investment projects indicate the conduct of such studies at environmental impact prices. In many cases, environmental risks at oil enterprises are classified as operational risks. Quantitative and qualitative assessment of economic risks at the stages of the project life cycle has a serious methodological and practical nature. The importance of such studies is due, firstly, to possible violations of natural laws and, secondly, to natural climatic factors, risks that have a negative impact on all stages of the project.

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Introduction. Oil and gas fields, pipelines, processing plants, and fuel tanks have a high potential for accidents of various types and man-made disasters that can pose a danger to people and the environment.

The variety of risks emerging at oil and gas industry enterprises, the importance of defining an integrated approach to minimizing accidents and disasters, as well as the importance of solving environmental risks, which occupy not the least place in the risk management system are considered important.

Safe operation of fuel areas will only be effective if they meet the highest requirements of international standards.

These are mainly standards ISO 9000 (quality management system), ISO 14000 (environmental management system) and ISO 45000 (occupational health and safety management system), other international documents related to environmental management and audit.

In the context of the integration of the Azerbaijani economy into the world economic system, as well as environmental problems, the tasks of assessing the activities of oil sector enterprises are very relevant.

From an economic point of view, if they are carried out at earlier stages of project implementation and organization, the costs of environmental discussion of projects including environmental risk assessment will be more effective. These costs are mainly reduced by creating an effective management system and avoiding environmental costs by oil industry enterprises reducing risks at production sites. However, unfortunately, at the pre-project stage, due attention is not paid to the discussion of calculations of lost environmental benefits (Бараненко, 2004).

Methodological principles of environmental risk management at oil and gas industry enterprises. Active risk management should be systematic, but currently more attention is being paid to fi-

nancial risks. At the same time, recent discussions of safety declarations for hazardous industrial facilities practically make it possible to create a system of detailed analysis of exposure to environmental risks throughout the entire production period at the pre-investment, investment and operational stages of oil field development and industry enterprises.

However, as a rule, environmental risks are not taken into account in feasibility study documents, and management documents justifying investment projects indicate the conduct of such studies at environmental impact prices.

In many cases, environmental risks in oil companies are classified as operational risks.

Quantitative and qualitative assessment of economic risks at the stages of the project implementation life cycle and product life cycle has a serious methodological and practical nature.

The importance of such studies is due, firstly, to possible violations of natural laws and, secondly, to natural climatic factors and risks that have a negative impact on all stages of the project.

The latter factors play a decisive role in pre-investment discussions. At the same time, regulatory requirements, especially environmental ones may change dramatically.

Environmental risks differ from the risks of force majeure in that most of them can be prevented.

However, insurance companies prefer to deal with the latter, although the profit from such a strategy is not so noticeable, even if an insured event occurs, the loss is huge.

Considering the current technological state of pipeline systems, berths and many technical structures in the oil industry, it is not so difficult to calculate the environmental risks and possible economic damage, for example, from the destruction of pipes in many places (Ализаде и др., 2010).

Even according to the roughest estimates, the annual costs of eliminating the consequences of accidents (excluding compensation for environmental damage) can amount to millions.

Therefore, registration of environmental risks of oil enterprises creates great opportunities for insurance activities (Aliyev, Alizade, 2012).

In addition, now it is necessary for oil companies to begin work on risk classification and the creation of a risk reporting system, as a result of which it will be possible to manage risks. Namely, risk management will be a somewhat integrative function that should be applied to all divisions and activities of oil enterprises. Environmental risks will not be given the last role in such an integration function.

This is confirmed by the fact that, unlike other production and project risks, a real basis for creating an environmental risk management system has al-

ready been created - this is the transition to ISO 14000 and ISO 31000 standards.

Stages of risk analysis. In general, the following main problems can be identified (Мəһərrəmov və б., 2014) while considering individual stages of risk analysis of oil and gas industry enterprises:

- risk exposure and hazard identification;
- assessment of dependence;
- risk characteristics.

Assessing and managing environmental risks requires more than just an analysis of the likelihood of negative events occurring. Another main factor in risk analysis is the economic assessment of the consequences of negative events.

For environmental risks, this assessment describes the determination of the amount of environmental and economic damage. Some of the existing problems have been discussed for a long time, others are specific to the field of economic risk assessment and environmental insurance (Буюнов, 2004).

The risk is calculated using the following formula (Попов и др., 2008):

$$R = P * X$$

R – volume of environmental and economic risk; P – possibility or probability of the occurrence of a negative moment or conditions (requiring financial costs); X – damage (volume of value).

First of all, the problem is linking the environmental consequences of this damage, its monetary measurement and moral damage for any violation of the state of the natural environment.

It should be noted that any assessment here is always controversial.

In addition to the difficulties of assessing moral damage, there are many controversial issues in such a precise definition, but these are the long-term consequences of negative environmental events (for example, assessing the significance of obvious changes in the ecosystem as a result of the influence of negative events). The hidden and far-reaching effects that occur and will occur in the ecosystem affect human health.

Another challenge is the outdated existing methods for calculating environmental and economic damage. When assessing environmental and economic damage, more objective and comprehensive methods are needed than those based on price indicators of the 90s of the XX century.

Significant difficulties in determining the economic assessment of environmental damage are associated with the incompleteness or lack of accuracy of existing methods.

Many of them rely on indirect methods for determining harm, which themselves require the use of more successful “cookie cutter” assessments.

In many cases, the lack of “ecological accuracy” is due to the fact that the resulting assessments are primarily human-centered.

Thus, the thresholds for the probability of effects are taken into account when assessing damage are determined primarily for humans, and not for other components of the environment (possibly more sensitive) or economic objects.

This problem is also associated with the lack of measures for assessing many representatives of the animal and plant world, taking into account their territorial “value,” as well as the lack of unified territorial inventories of natural resources and calculations of the ecological potential of various species (Aliyev, Alizade, 2012).

Problems of environmental and economic assessment (including insurance cases) must be solved by developing new methods for calculating damage.

Such methods should be based on a modern method of assessing natural resources, modern methods for determining changes in the environment, damage caused by negative impacts on its components, and should be focused not only on humans, but also on other realities of the environment.

The feasibility of such work is also due to the importance of an accurate economic assessment of negative environmental consequences. It is clear that effective risk management should ultimately lead to risk reduction. However, for this it is necessary to compare the results of economic activity with the income received and costs aimed at eliminating the negative results, the so-called “environmental costs”.

In this case, the effectiveness of environmental risk management will be fully assessed by comparing the funds invested in preventive measures and the costs incurred for liquidation and compensation of damage. Environmental payments must fully cover environmental costs, and tariffs must fully cover the costs of accidents at enterprises.

In such conditions, taking into account environmental payments, enterprises are faced with a choice: either to hide the fact of the accident and evade payments (due to force majeure), or to solve the problems of environmental insurance strictly by assessing the relevant environmental risks (Sylvia Adipah, 2018).

The latter is considered preferable, since “every hidden secret is revealed sooner or later,” and the possible financial payout can be very difficult even for large companies.

Thus, the environmental organization of each individual type of risk is transferred to a strategic category, which is considered relevant in corporate risk management (Буянов, 2004).

Currently, the functions of environmental insurance in developed countries are receiving more and more attention. It is known that this primarily expresses the interests of the population, the state and legal entities regarding various risks in the natural scientific environment. Expanding the essence of environmental insurance as a mechanism for environmental management involves giving it preventive, monitoring, compensation and investment functions (Israfilov et al., 2016).

It is necessary to provide for the development of the following promising types of environmental insurance for oil and gas industry enterprises:

- environmental insurance;
- agreement of liability for failure to comply with the terms of the contract for the use of natural resources;
- insurance against extreme natural disasters;
- insurance of financial, investment and business risks in the environmental environment.

Risk management should focus primarily on minimizing financial risks. The main goal of this approach is to ensure predictable financial results, including those aimed at eliminating accidents and compensating for environmental damage (Хисметов и др., 2009).

In other words, the formation of environmental insurance funds should not be blind and should be reflected as a separate line item in environmental protection expenditures.

Accounting for economic risks. A rather serious problem is that state statistics authority only register major accidents associated with fires, floods and other situations. It is known that there are other accidents that do not have huge consequences and they are covered at the expense of own funds of the company and do not require wide discussion.

This summary applies not only to fixed assets, and calculating the loss is not difficult since the book values of fixed assets are known.

It is more difficult to calculate the damage caused to the environment and people by the collapse of one or another engineering equipment as a result of emergency situations (Ализаде и др., 2023).

Oil sector facilities in a market economy, first of all, do not accurately take into account economic risks; they usually ignore man-made and environmental (natural) risks (Israfilov et al., 2016).

However, presenting such categorical risks in monetary terms can radically change the attitude towards environmental issues at oil sector enterprises. Therefore, the basis for regulating safety in the technogenic environment should be based on an economic assessment, since in market conditions the main role is played by the interaction of the “cost-effectiveness” criteria.

To summarize the above, I would like to propose that the development of an economic mechanism for ensuring the environmental safety of enterprises in the oil sector should be carried out considering the following areas:

- the emergence of economic regulation of environmental safety (for example, strategies for reducing environmental risks and integrated environmental risk management);
- preparation of an economic mechanism for regulating environmental safety and its approval (for example, an action plan to reduce environmental risks);
- experimental modeling of the mechanism for environmental safety control;
- legal and regulatory support;
- development of a monitoring mechanism for environmental safety regulation;
- formation of environmental insurance funds for environmental protection costs;
- development of a mechanism for stimulating the head of the enterprise and risk managers and vesting high powers to resolve a specific issue in order to prevent an environmental disaster.

The goal of integrated environmental risk management in the oil and gas industry is to regulate rules, ensure the safety of enterprise workers and the environment, identify and implement preventive measures before an accident or risk occurs, and eliminate consequences, conscious risk and conducting appropriate training (Aliyev, Alizade, 2012).

To achieve the environmental safety goals and the upcoming strategic goal, it is necessary to start by defining responsibilities in environmental risk management (Aliyev, Alizade, 2013).

Namely, the strategic management and employees of an oil company or enterprise are responsible for risk management within the limits of their authority.

To achieve this, the powers and responsibilities must be clear to each responsible person.

• The powers of a strategic manager of an enterprise include:

– determine the criteria for the significance of risks, approve methodological documents, determine priorities, approve measures, make decisions on rapid response measures by reviewing reports, evaluate the effectiveness of measures aimed at managing and eliminating risks and monitoring the implementation of the program of measures.

• The powers of the head of a structural unit (risk owner) include:

– be responsible for risk management within the scope of activities of divisions, bring into action general control over the risk management process, identify and assess risks within the division, develop measures aimed at risk management and organize

the monitoring process, as well as provide information (reports) to management on changes.

• Risk management units (risk managers) are responsible for: developing standards and methodologies for risk assessment, providing guidelines in the field of identifying, assessing and managing risks within their competence, monitoring the risk management process by structural units and risk management to monitor the implementation of the plan actions.

• Environmental departments are responsible for: identifying environmental problems and risks for the structural divisions of the enterprise, determining appropriate measures and monitoring the implementation of environmental programs. He instructs employees in this area, constantly monitors the implementation of environmental programs and monitors the implementation of the environmental action plan.

On the system for monitoring the implementation of environmental protection measures.

In order to ensure the effective functioning of the environmental risk management system, it is necessary to carry out regular monitoring in the relevant areas of activity of structural units.

Responsibility for monitoring lies with the management of this structural unit, the environmental department and the risk management department.

In order to monitor the implementation of pre-planned activities, the results of the implemented monitoring and identified deficiencies should be recorded, analyzed and given the necessary recommendations to the risk owner, and the final report compiled on the monitoring results should be submitted to the company management.

Conclusion. Based on the above, as well as practical experience, it is possible to classify environmental risks identified in the oil and gas industry into the following seven areas according to their characteristics:

1. Field of geology and geophysics;
2. Oil and gas well drilling site;
3. Oil and gas production area;
4. Oil and gas transportation area;
5. Oil and gas processing area;
6. Petrochemical industry;
7. Construction site.

In general, environmental risks identified in areas of activity can be divided into two groups according to the degree of impact:

✓ Environmental risks that directly affect the environment;

✓ Environmental risks that led to disasters.

Based on practical experience, the authors proposed to apply the following innovative measures in order to improve the system and mechanism for managing environmental risks in oil and gas companies:

1. Preparation of an environmental impact assessment (EIA) document, conducting an environmental assessment and other necessary environmental regulatory and technical documents before carrying out work in accordance with the requirements of environmental legislation;

2. Environmental monitoring, accounting and reporting on the environmental impact of economic activities that may cause environmental hazards;

3. Carrying out constant laboratory monitoring of the compliance of discharges into the environment on the territory of the enterprise with permissible maximum standards;

4. Monitoring compliance with environmental standards and safety rules when disposing of all oils and other waste oils containing polychlorinated biphenyl (PCB) used in electrical equipment (in electrical equipment with a chlorine content of more than 50 ppm);

5. Approval and implementation of the documents "Strategy for reducing the impact on climate change" and "Plan for reducing greenhouse gas emissions";

6. Approval and implementation of the document "Waste Management Plan";

7. Approval and implementation of the document "Oil Spill Response Plan";

8. In order to prevent the spread of environmental damage, the forming of teams that will take immediate action in case of accidents and provide technical means;

9. Regular propaganda of environmental risks and their consequences, installation of warning and propaganda posters and billboards at workplaces;

10. Development of an appropriate training program on environmental risk management.

Research methods. Significant difficulties in determining the economic assessment of environmental damage are associated with the incompleteness or lack of accuracy of existing methods. Many of them rely on indirect methods for determining harm, which themselves require the use of more successful "cookie cutter" assessments.

Problems of environmental and economic assessment (including insurance cases) must be solved by developing new methods for calculating damage.

Such methods should be based on a modern method of assessing natural resources, modern methods for determining changes in the environment, damage caused by negative impacts on its components, and should be focused not only on humans, but also on other realities of the environment.

Scientific novelty. In order to improve the system and mechanism for managing environmental risks in oil and gas companies, it is considered advisable to apply the following innovative measures: preparation of EIA and other necessary environmental regulatory and technical documents; accounting and

reporting on the environmental impact of economic activities that may cause environmental hazards; carrying out constant laboratory monitoring of the compliance of discharges into the environment on the territory of the enterprise with permissible maximum standards; regular propaganda of environmental risks and their consequences at workplaces.

Results. Environmental risks identified in the oil and gas industry were classified based on their characteristics in seven areas (geology and geophysics; oil and gas well drilling area; oil and gas production area; oil and gas transportation area; oil and gas processing area; petrochemical industry; construction area). In general, environmental risks identified in areas of activity were considered according to the degree of their impact and divided into those that directly affect the environment and those that led to disasters.

Practical value. Based on practical experience, the authors proposed to apply the following innovative measures in order to improve the system and mechanism for managing environmental risks in oil and gas companies:

1. Preparation of an environmental impact assessment (EIA) document, conducting an environmental assessment and other necessary environmental regulatory and technical documents before carrying out work in accordance with the requirements of environmental legislation;

2. Environmental monitoring, accounting and reporting on the environmental impact of economic activities that may cause environmental hazards;

3. Carrying out constant laboratory monitoring of the compliance of discharges into the environment on the territory of the enterprise with permissible maximum standards;

4. Monitoring compliance with environmental standards and safety rules while disposing of all oils and other waste oils containing polychlorinated biphenyl (PCB) used in electrical equipment (in electrical equipment with a chlorine content of more than 50 ppm);

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ЭФФЕКТИВНОЕ УПРАВЛЕНИЕ ЭКОЛОГИЧЕСКИМИ РИСКАМИ НА ПРЕДПРИЯТИЯХ НЕФТЕГАЗОВОЙ ОТРАСЛИ

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Резюме. На фоне бурного развития технологий в современном мире применение системы корпоративного управления транснациональных нефтегазовых компаний и формирование положительного рейтинга основаны на комплексном управлении рисками. Факторы риска, формирующие рейтинг инвестиционной привлекательности территорий, особенно экологические риски, не всегда учитываются при оценке их воздействия.

В условиях интеграции национальной экономики в мировую экономическую систему задача оценки деятельности предприятий нефтяного сектора является весьма актуальной. С экономической точки зрения управление экологическими рисками проектов более эффективно, если они реализуются на более ранних стадиях реализации и организации проекта. К сожалению, подсчету утраченных экологических выгод не уделяется должного внимания.

Активное управление рисками должно носить системный характер, однако в настоящее время больше внимания уделяется финансовым рискам. В то же время недавние обсуждения деклараций безопасности опасных промышленных объектов практически позволяют создать систему детального анализа подверженности экологическим рискам в течение всего периода добычи на прединвестиционном, инвестиционном и эксплуатационном этапах разработки нефтяных месторождений, предприятиях отрасли. Однако, как правило, в документах технико-экономического обоснования экологические риски не учитываются, а в управленческих документах, обосновывающих инвестиционные проекты, указывается проведение таких исследований по ценам воздействия на окружающую среду.

Во многих случаях экологические риски на нефтяных предприятиях относят к операционным рискам. Количественная и качественная оценка экономических рисков на этапах жизненного цикла проекта имеет серьезный методический и практи-

ческий характер. Важность подобных исследований обусловлена, во-первых, возможными нарушениями естественных законов и, во-вторых, природными климатическими факторами, рисками, оказывающими негативное влияние на все этапы реализации проекта.

Ключевые слова: управление рисками, экологические риски, экологическая безопасность, нефтегазовые предприятия, экологическое страхование, охрана окружающей среды.

NEFT VƏ QAZ SƏNAYESİ MÜƏSSİSƏLƏRİNDƏ EKOLOJİ RISKLƏRİN EFFEKTİV İDARƏ EDİLMƏSİ

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Xülasə. Müasir dünyada texnologiyanın sürətli inkişafı fonunda transmilli neft-qaz şirkətlərinin korporativ idarəetmə sisteminin tətbiqi və müsbət reytingin formalaşması risklərin hərtərəfli idarə olunmasına əsaslanır. Sahələr üzrə investisiya cəlb ediliyi reytingini formalaşdıran risk faktorları, xüsusilə ekoloji risklər təsirini qiymətləndirərkən heç də həmişə nəzərə alınmır.

Milli iqtisadiyyatın dünya təsərrüfat sistemində inteqrasiyası şəraitində neft sektoru müəssisələrinin fəaliyyətinin qiymətləndirilməsi vəzifələri olduqca aktualdır. İqtisadi nöqtəyi-nəzərdən, əgər onlar layihənin icrasının və təşkilinin daha erkən mərhələlərində həyata keçirilərsə, layihələrin ekoloji risklərinin idarə olunması daha səmərəli olar. Lakin təəssüf ki, itirilmiş ekoloji faydaların hesablamalarına lazımi diqqət yetirilmir.

Risklərin aktiv idarə edilməsi sistemli olmalıdır, lakin hazırda maliyyə risklərinə daha çox diqqət yetirilir. Eyni zamanda, təhlükəli sənaye obyektləri üçün təhlükəsizlik bəyannamələrinin son müzakirələri praktiki olaraq neft yataqlarının işlənməsinin investisiyadan əvvəlki, investisiya və istismar mərhələlərində bütün istehsal dövrü ərzində ekoloji risklərə məruz qalmanın ətraflı təhlili sistemini yaratmağa imkan verir.

Bununla belə, bir qayda olaraq, texniki-iqtisadi əsaslandırma sənədlərində ekoloji risklər kifayət qədər nəzərə alınmır və investisiya layihələrini əsaslandırmaq üçün sənədləri belə tədqiqatların ətraf mühitə təsir qiymətləri ilə aparılmasını göstərir.

Bir çox hallarda neft şirkətlərində ekoloji risklər əməliyyat riskləri kimi təsnif edilir. Layihənin həyata keçirilməsinin dövrü mərhələlərində iqtisadi risklərin kəmiyyət və keyfiyyətə qiymətləndirilməsi ciddi metodoloji və praktik xarakter daşıyır. Belə tədqiqatların əhəmiyyəti, birincisi, təbii qanunların mümkün pozuntuları, ikincisi, təbii iqlim amilləri və layihənin bütün mərhələlərinə mənfi təsir göstərən risklərlə bağlıdır.

Açar sözlər: risklərin idarə edilməsi, ekoloji risklər, ekoloji təhlükəsizlik, neft müəssisələri, ekoloji sığorta, ətraf mühitin mühafizəsi