



## Oil and gas complex objects influence minimization on environment condition

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In terms of the current ecological and economic situation in Ukraine for any production industry, and especially for the oil and gas complex, the most urgent aspect of the activity is the issue of interrelatedness of economic parameters and production prospects with environmental and environmental parameters. Recently, the attention of scientists and the public to the results of the oil and gas industry, and especially in terms of its impact on the environment and human health increases.

Poltava region ecological situation state constant monitoring of its changes, identification of the most influential factors and environmental pollutants have recently been one of the important areas of research carried out by Poltava National Technical Yuri Kondratyuk University. The results of researches are published in the works of the diverse scientific and practical directions, in particular in special editions of a unique series of publications of the "Ecological Library of Poltava Region", which was initiated and supported by PoltNTU. The focus of research data is, firstly the possibility of scientific substantiation of the managerial and programmatic decisions taking at the regional and local levels, and, secondly, the development of scientific and practical decisions and measures aimed at minimizing the negative impact of production facilities on the state the environment.

A special place in these studies is occupied by the impact assessment of the oil and gas complex on the environment state and the rationale for choosing ways to minimize it. The statement of these issues was reflected in the development of program documents at the regional level, in particular the programs "Environment-2010", "Environment-2015", "Environment-2021", the developer of which during the last 18 years was Poltava National Technical Yuri Kondratyuk University. The importance of the impact of the objects of the oil and gas complex environment state is also found in the information and statistical documents of the environmental authorities of our region.

The main pollutants emitted into the atmosphere from the stationary sources of the oil and gas complex are carbon monoxide; nitrogen compounds; methane; non-methane volatile organic compounds. These pollutants are leading among all substances that get to the atmosphere from stationary sources of enterprises located on the territory of the region.

Ecosystems state impact occurs during the development and operation of oil and gas condensate fields. Therefore, in the Poltava region as one of the leading regions of Ukraine in terms of oil production, considerable attention is paid to environmental research and assessment of the natural and resource potential of the region.

In the course of the activities of the oil and gas facilities (at the stages of drilling, exploitation of oil and gas deposits, transportation and processing of hydrocarbon raw materials), land alienation takes place, significant volumes of contiguous water and industrial wastewater are formed, a wide species composition and significant volumes of waste from production and consumption, which requires the search, development, scientific and technical substantiation and implementation of appropriate practical measures.

Despite the importance of assessing the impact of the oil and gas complex on the environment state to this day, the scientific and practical approach in solving this problem remains underestimated. A compulsory initial stage in solving this problem is the definition of the directions of scientific and practical work.

That is why the industrial activity specifics of the industry enterprises require constant search for ways and measures that can provide certain guarantees and cause the corresponding interest of the enterprises themselves in carrying out works aimed at ensuring the environmental safety of the enterprise itself and the environment; ecological and economic risks minimization at the enterprise activity; maximum consideration of resource and environmental factors of enterprise development. Poltava National Technical Yuri Kondratyuk University specialists can contribute to solving these problems to a large extent.

Therefore, the basic issues that need to be addressed are the issues of controlling emissions, handling of waste from production, and solving the problems of water resources and soil protection. Important attention requires the improvement of management environmental activities.

To address these issues, the main areas of scientific and practical work that are carried out and can be carried out by PoltNTU specialists for enterprises in the oil and gas industry are the follows:

1. Control of pollutant emissions from enterprise and control over the efficiency dust treatment plants work.
2. Inventory of production and consumption wastes, control and certification of waste disposal sites.
3. Analysis of changes in the level of pollution of soils and groundwater, which is a drinking resource, in the areas of influence of objects of oil and gas complex.
4. Development of remediation projects and measures for the restoration of biodiversity in the alienated territories of the oil and gas complex objects.
5. Methods development for the elimination of soil and groundwater contamination when oil spills.

One example of such activity was the research work carried out in 2014-2017 by Poltava National Technical Yuri Kondratyuk University, commissioned by PJSC "Naftogazvydobuvannya", which included inventory of production and consumption wastes, which are formed at the objects of the "Semiurenki" "Machuhi" and "Olefirivka", determination of indices of normative volumes of waste generation, definition of the hazard class of each type of waste and development of recommendations for these waste handling according to regulatory requirements. The main result of these works, which were implemented in the production activities, was the organization of collection and temporary storage of waste system at the enterprises with the provision of proper, environmentally safe conditions for the collection of each type of waste, depending on their class of hazard, physical and chemical characteristics, aggregate state and developed recommendations for rational treatment of them.

Thus, the experience of carrying out works by Poltava National Technical Yuri Kondratyuk University in the field of assessing oil and gas complex objects impact on the environment state allows:

- To provide enterprises with the necessary consulting and engineering assistance in solving environmental problems, developing engineering and technical documentation for the use of techniques without sump drilling; documentation on the assessment of the negative environment impact may arise during the operation of facilities and equipment of drilling and oil and gas exploration enterprises and caused, for example, by leaks of drilling fluids, liquid hydrocarbons and other types of process liquids;
- To develop design solutions to minimize such impact;
- To provide for the application of measures to minimize the negative effects of corrosion on drilling and oil and gas and industrial equipment;
- To ensure enterprises meet current legislation and provide appropriate guarantees for their technological and environmental safety.

The expected result of the proposed types of work implementation is a phased reduction in the level of technogenic risk of the enterprises themselves, minimization of their environmental impact and the transition to more rational use of the natural resource potential of the region and raising the level of environmental safety in the region as a whole.

The experience of carrying out scientific researchers at the Poltava National Technical Yuri Kondratyuk University for 18 years has been reflected in the program documents development at the regional level:

- 1) Regional program of environmental protection, rational use of

natural resources and ensuring environmental safety taking into account the regional priorities of the Poltava region for 2017-2021 ("Environment-2021");

2) Integrated Solid Waste Management Program in Poltava Region for 2017-2021;

3) Regional target program for the development of water management and ecological improvement of the Dnipro river basin in the Poltava region until the year 2021.

Consequently, it can be argued that the development of enterprises in the oil and gas industry, supported by scientific and technical products of scientists of the Poltava National Technical Yuri Kondratyuk University, will enable the production of its own hydrocarbon raw materials with a minimum level of negative impact on the environment.