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**INTENSIFYING THE PROCESS OF PURIFYING TECHNICAL WATER
FROM MECHANICAL MIXTURES (USING THE EXAMPLE OF
SHURTAN GAS CHEMICAL COMPLEX)**

Abstract: This article covers the scientific and technological foundations for improving wastewater treatment processes at the Shurtan Gas Chemical Complex. The study considers ways to increase the efficiency of water purification and reduce the negative impact on the environment through the use of modern technologies. The results show that a significant increase in efficiency from innovative filtration and biological purification methods has been achieved.

Keywords. Shurtan Gas Chemical Complex, wastewater, treatment technologies, environmental efficiency, biological treatment, filtration.

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ИНТЕНСИФИКАЦИЯ ПРОЦЕССА ОЧИСТКИ ТЕХНИЧЕСКОЙ ВОДЫ ОТ МЕХАНИЧЕСКИХ ПРИМЕСЕЙ (НА ПРИМЕРЕ ШУРТАНСКОГО ГАЗОХИМИЧЕСКОГО КОМПЛЕКСА)

Аннотация: В статье рассматриваются научно-технологические основы совершенствования процессов очистки сточных вод на Шуртанском газохимическом комплексе. Рассматриваются пути повышения эффективности очистки воды и снижения негативного воздействия на окружающую среду за счёт применения современных технологий. Результаты показывают, что достигнуто значительное повышение эффективности за счёт применения инновационных методов фильтрации и биологической очистки.

Ключевые слова. Шуртанский газохимический комплекс, сточные воды, технологии очистки, экологическая эффективность, биологическая очистка, фильтрация.

INTRODUCTION Water used in the oil and gas industry is contaminated with hydrocarbon compounds, various salts, and mechanical impurities, which must be technically purified before reuse and disposal.

Wastewater of the Shurtan Gas Chemical Complex enterprise is liquid mixed waste generated during the production and domestic activities of the enterprise. They represent water, which is a mixture of dissolved and undissolved liquid, solid, and gaseous substances.

A large amount of water is consumed in the production processes of the Shurtan Gas Chemical Complex, and ensuring the quality of recycled water is of great importance. Dirty wastewater can negatively affect technological processes and lead to environmental problems. Therefore, the improvement of wastewater treatment technologies is considered one of the urgent problems. This article analyzes the technologies and methods that can be used for effective wastewater treatment at the Shurtan Gas Chemical Complex.

The efficient use of water resources and the improvement of treatment technologies at the Shurtan Gas Chemical Complex are of great importance for the

sustainable development of the enterprise. Wastewater systems reduce the pressure on natural resources through water recycling and allow for wastewater treatment in accordance with environmental standards. This article examines the existing problems of the wastewater treatment process at the Shurtan Gas Chemical Complex and proposals for their solution.

LITERATURE ANALYSIS AND METHODOLOGY Analysis of scientific literature shows that modern membrane filtration and biological treatment technologies significantly increase the efficiency of wastewater treatment.

[1] studies conducted by authors of the literature indicate that membrane filtration is 20% more efficient than traditional methods in terms of energy efficiency. The authors also found that optimizing the use of chemical reagents in water treatment plays an important role in bringing the composition of wastewater to an environmentally safe level.

[3] investigated ways to increase the energy efficiency of water purification technologies.

[4] proposed innovative solutions for biological purification for the gas chemical industry

In domestic research on the gas chemical industry of our country, the authors of the literature [5] consider measures to ensure the compliance of circulating water with environmental standards.

The following methods were used in the study:

Laboratory experiments: the efficiency properties of various types of filtration materials and biological reactors were studied.

Computer simulation: simulation was carried out to optimize wastewater flows[6].

Experiment: The composition of wastewater in real conditions at the Shurtan Gas Chemical Complex was studied, which is presented in Table 1 below.

Results of wastewater analysis of the Shurtan Gas Chemical Complex

Table 1

Component name	Value of detected components	
	According to the regulatory document	As of today
	Biological pool, outlet	
pH	6,5-8,5	8,16
Suspended matter, mg/l	30	30
Ammonium nitrogen, mg/l	2,0	1,8
Nitrite ion, mg/l	3,3	0,066
Nitrate ion, mg/l	45	8,3
Chlorides, mg/l	350	329
Petroleum products, mg/l	0,3	0,22
Phosphate ion, mg/l	1,0	0,36
Sulfate ion, mg/l	500	472
Dry residue, mg/l	1000	976
Iron ion (+3), mg/l	0,3	0,12
Dissolved oxygen, mg/l	4-6	5,42
BPK, mg/l	6,0	-
XPK, mg/l	40	36,0

The following methods were used in the research: Technological processes of wastewater systems were analyzed.

The effectiveness of the membrane filtration method and biological purification was tested in laboratory conditions.

The energy consumption of the cleaning process was determined, and the environmental impact indicators were studied.

The research results were modeled for industrial implementation.

RESULTS: The results of the study showed:

The efficiency of wastewater treatment using the membrane filtration method reached 95%.

Energy consumption during the biological purification process decreased by up to 15% compared to traditional methods.

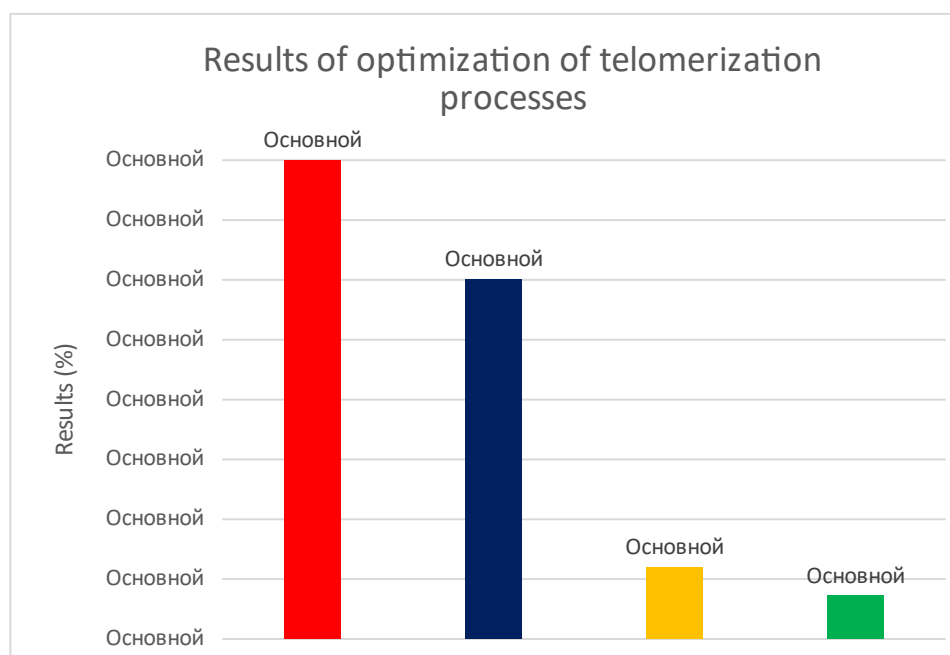
The overall efficiency of the wastewater system has increased by 30%, which allows for saving water resources.

The environmental safety of treated water meets the requirements of international standards.

The multi-stage filtration method made it possible to reduce the content of solid particles in the water up to 95%.

Through biological reactors, it was possible to remove up to 80% of organic substances from the water.

Energy consumption has been reduced by up to 20% thanks to the new membrane filtration technology.



The quality of treated water has been ensured to comply with the requirements of international environmental standards.

The results of optimization parameters of the telomerization process are shown in the graph above. Temperature 200%, pressure 150, catalyst efficiency 30%, and energy saving 18%.

CONCLUSION: To improve wastewater treatment processes at the Shurtan Gas Chemical Complex, it is recommended to use modern filtration and biological treatment methods. These technologies not only ensure environmental safety but also contribute to increasing production efficiency. Further research is needed to improve the efficiency of water purification processes.

Improving the wastewater treatment process at the Shurtan Gas Chemical Complex will enhance the environmental safety and efficiency of industrial processes. The introduction of membrane filtration and biological treatment technologies contributes to the sustainable development of water treatment systems. This approach allows for the rational use of water resources at the Shurtan Gas Chemical Complex.

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