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**G.K. Mukusheva, N.S. Sarsembiyeva**

Atyrau University named after H. Dosmukhamedov, Atyrau  
[mukusheva66@mail.ru](mailto:mukusheva66@mail.ru), [sarsenbieva\\_n@mail.ru](mailto:sarsenbieva_n@mail.ru)

## **STUDY OF EMISSIONS OF POLLUTING SUBSTANCES FROM ANPZ TO ENVIRONMENT AND DEVELOPMENT OF RECOMMENDATIONS FOR THEIR DECREASE**

**Abstract.** The study of emissions of pollutants from the Atyrau Refinery into the environment is a hot topic for many years, the authors have made recommendations to reduce their negative impact on nature and go to sustainable industrial development. The object of the labor market is labor, and the labor bearer - labor force - labor resources, which are characterized by such basic indicators as employment and unemployment. The research consisted of the works of domestic and foreign leading economists. In the course of the study, the author applied methods of system, comparative, factor analysis, as well as methods of statistical analysis of economic processes. In the course of carrying out the work, the author used general methodological principles that made it possible to most fully and objectively investigate problems. The solution to the problems of air and water pollution, biodiversity conservation should be based on the responsibility and transparency of the actions of each participant in this process. Atmospheric emissions of pollutants in the Atyrau region are equal to the amount of emissions in industrialized regions, such as Karaganda, Pavlodar and East Kazakhstan regions. The recommendations proposed to reduce emissions in the study are elementary, first of all, to bear full responsibility for the pollution of nature and apply the world experience of microbial purification of oil-contaminated soils, which is the most efficient in the world.

**Keywords:** emissions, pollution effects, environment, production, reduction.

### **INTRODUCTION**

Most of the problems that have now faced mankind are of a man-made nature and are associated with the socio-economic transformations taking place in the country. Therefore, it is in vain to hope that they will disappear on their own, without human intervention. Practical efforts in the direction of environmental protection, changing the model of production and consumption, solving problems of air and water pollution, preserving biodiversity should be based on responsibility and transparency of actions of each participant in this process.

### **MAIN PART**

The territory of the RK covers four climatic zones: forest-steppe (8% of the total area of the country), steppe (26%), semi-desert (14%) and desert (44%). The forest-steppe regions include moisture-rich plains of the north of the country. Steppe occupies a vast territory, located south of the first. In the central part of the Republic of Kazakhstan is a semi-desert part of the dry steppes, and the desert zone occupies most of the flat belt of the south of the country. Duration of sunshine on the territory of Kazakhstan - 2000 - 3000 hours.

In 2018, compared with 2017, the production of crude oil, natural gas and metal ores increased. The production of food, tobacco, oil refining, chemical products, rubber and plastic products, the metallurgical industry and mechanical engineering increased. At the same time, the production of ferrous metallurgy decreased.

Industrial production indices tend to grow in all 14 regions of the republic for 2018 as a percentage of the corresponding period of the last year in Figure 1.

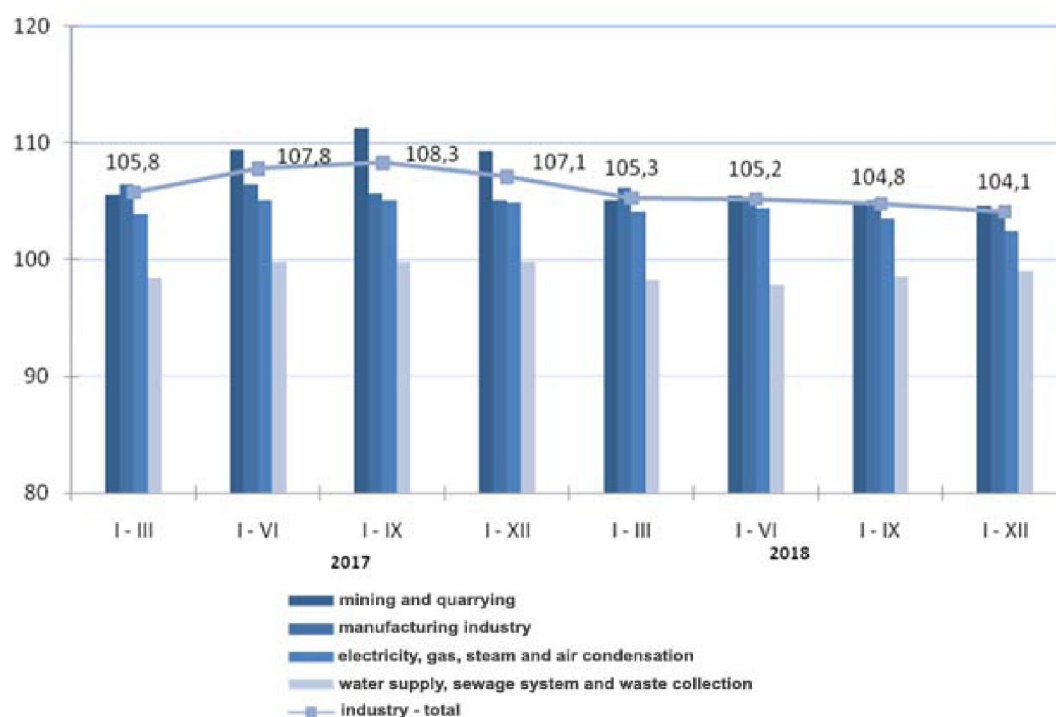


Figure 1 - Industrial production indices

As can be seen from the figure, mining and quarrying has a high index in mid-2017, but in 2018 this figure tends to decrease. The lowest index for water supply, sewerage and waste collection. For a better understanding, consider the production of certain types of products for 2018.

Table 1 - Production of certain types of products in January-December 2018

Types of products	Produced by	2018 by 2017, in%
oil, including gas condensate, mln. tons	90,4	104,8
copper ores, million tons	103,2	108,6
flour, mln. tons	4,0	100,7
gasoline, million tons	4,0	129,8
gas oil (diesel fuel), mln. tons	4,7	107,4
Portland cement, mln. tons	9,9	105,5
flat steel, mln. tons	2,5	89,5
refined copper, million tons	0,4	102,8
electricity, billion kWh	107,1	103,8

The production of copper ore (103.2), electric energy (107.1) and oil, including gas condensate (90.4), has the highest rate, that is, these are the main industries polluting the environment.

In the Republic of Kazakhstan, the East Kazakhstan, Karaganda and Pavlodar regions are the most industrialized and, therefore, the most polluted. The main volumes of pollutants were formed in the territories of Karaganda (596.4 thousand tons), Pavlodar (552.9 thousand tons), Aktobe (134.3 thousand tons), East Kazakhstan (127.2 thousand tons), and Atyrau (110.6 thousand tons) regions.

Air emissions of pollutants in the Atyrau region amounted to 130.4 thousand tons (5% of the total emissions in Kazakhstan). The largest number was only in Karaganda, Pavlodar and East Kazakhstan regions. The level of purification of pollutants is very low.

In the shelf zone of the Caspian Sea, over-salt Gran, Martyshe, Zhanatalap, Buzuchi, Karazhanbas, Kalamkas fields have been operating for more than 30 years, and since 1993, the pre-salt Tengiz oil and

gas field. Emissions include hydrocarbons, hydrogen sulfide, oxides of sulfur, nitrogen and carbon. These substances enter the atmosphere and are adsorbed by the underlying surface. The maximum level of atmospheric pollution with hydrogen sulfide falls on 1999, and oxides of sulfur and nitrogen - on 2000. The water accumulates surfactants, phenols, petroleum products and heavy metals, and acidification of water is noted.

The main factors of spatial dispersion of technogenic emissions are weather conditions: wind direction and speed, air temperature, precipitation, relative air humidity, etc. Gas-dust emissions deposited on the soil surface are firmly fixed in the upper horizon.

Significant areas are flooded with emissions of oil and drilling mud. In the soils of all deposits, the gross forms of heavy metals (cadmium, mercury, copper, cobalt, selenium, antimony, lead) do not exceed the MPC, with the exception of certain sections of the Tengiz deposit, where the lead content is 60 mg / kg and exceeds the MPC by 2 times, and on Profile 1 and UE - exceeds the MPC by 8-12 times, and the total zinc content is 18-29 times. The arsenic content in places is 15-30 times higher than the MPC. The accumulation in the soils of heavy metals occurs mainly through anthropogenic emissions into the atmosphere of dust, smoke, and aerosols. Plants accumulate heavy metals (copper, zinc, cobalt, lead, cadmium). However, their content is significantly lower than the maximum allowable level (MRL) for feed, excluding nickel. Succées have a high absorption capacity.

Soil contamination with heavy metals occurs due to the inefficient use of natural resources, including oil and gas production.

Also, the main reasons for the harmful effects of vehicle emissions are the low quality of the fuel used and the inefficient distribution of traffic flows in the city, causing congestion on the main streets of the city (next to which observation posts are located), accompanied by additional tons of exhaust gases polluting the air.

At present, an investment strategic project "Construction of a Deep Oil Refining Complex" is being implemented at the Atyrau Refinery. The project is included in state and sectoral programs: The state program of industrial and innovative development of the Republic of Kazakhstan for 2015-2019, approved by the Decree of the President of the Republic of Kazakhstan dated August 01, 2014, No. 874; Republican map of industrialization for 2015-2019, approved by the Government of the Republic of Kazakhstan dated December 31, 2014, No. 1418;

In hydrogeological terms, the territory is confined to the southeastern part of the West-Caspian artesian basin of the second order. The main load of anthropogenic impact, as a rule, are borne by aquifers, which are the first to be deposited from the surface. On the territory of the Atyrau Refinery, such are continental aquifers - modern and upper quaternary alluvial and alluvial-deltaic (a + d Q III-IV), aquifer thickness is 3-9 m, sediments are represented by fine-grained sand and sandy loam, sandy clay. The depth of groundwater from 0.5 to 6.0m.; Pollution of the Caspian Sea and r. The Urals from "ANPZ" LLP through groundwater is excluded due to a meager hydraulic bias, a very small slope of the terrain of small amount of precipitation, poor water content of aquifers and a relatively low filtration coefficient. The main potential sources of groundwater pollution currently include the evaporation pond on the left-bank part of Atyrau. The wastewater evaporator pond has existed for more than 60 years and receives wastewater not only from the ANPZ LLP, but also discharges of industrial and public utilities from the entire left-bank part of Atyrau and, thus, is among the most significant potential sources of influence on groundwater at present time.

In recent decades, the drain p. The Urals are influenced by many factors of economic activity, the most significant of which is the presence of the Irikliinsky reservoir, commissioned in 1958. The opening of the river from the ice in the lower reaches of the Urals takes place in the second half of March. In some years, melting of ice can be observed both in early March and in the first five days of April. In the lower reaches of the river. The Urals does not accept tributaries, in connection with which its turbidity does not significantly increase as compared with the headwater (320 mg / l). Ws Poplar it is equal to 390 mg / l. Water salinity in the river varies from 600-800 mg / l in the flood period to 1.0 g / l in the pre-spring period. Mode of hydrochemical parameters p. The Urals are very dynamic both in the seasons and in individual years. In general, the river is polluted with oil products, phenols and nitrogen compounds.

The main reasons for the harmful effects of vehicle emissions are the poor quality of the fuel used and the inefficient distribution of traffic flows in the city, causing congestion on the main streets of the city

(next to which observation posts are located), accompanied by additional tons of exhaust gases polluting the air basin.

Despite the improvement of economic and environmental indicators, these processes do not increase the depth of oil refining at LLP "ANPZ" and the adopted refining scheme cannot provide the current level of conversion today. To do this, you need to add processes that provide deep processing of heavy oil fractions.

Production wastes cause environmental degradation: damage to aquifers, coastal areas, forests and other vulnerable ecosystems. Urbanization in coastal areas causes a rapid deterioration of coastal and marine ecosystems. Therefore, it is important to monitor urban development trends in order for sustainable development of human settlements to be viable. One of the main tasks in building a sustainable urbanized world is to harmonize the development needs of the city with the interests of the natural environment. In particular, it is necessary to protect aquifers and other freshwater resources, coastal areas from the harmful effects of industrial enterprises, which are land-based sources of pollution, and from human settlements.

To reduce pollution of the surrounding area, a complex of the following main measures is envisaged: - circulation of the flushing fluid is carried out in a closed cycle: well - circulation system - receiving tanks - injection line - well; - cleaning and disposal of drilling waste water; - compliance with the technological regulations for drilling; - timely repair of equipment; - Preventing the discharge of industrial wastewater to the terrain.

To prevent emergency situations, the following activities should be performed:

- compliance with the technological parameters of the main production and ensuring the normal operation of facilities and equipment;
- accumulation of accidental spills of liquid products and their return to the recycling system;
- the prohibition of emergency discharges of wastewater or other hazardous liquids on the terrain;
- development of a specialized emergency response plan (measures to limit, eliminate the consequences of a potential accident);
- availability of the necessary technical means to remove pollutants;
- carrying out planned preventive maintenance of equipment;
- automation of emergency process protection systems, the use of warning and pre-emergency signaling.

## CONCLUSION

It is necessary to carry out work on the removal of oil from contaminated sites. Existing methods for the remediation of soils contaminated with petroleum products are based on the removal of highly contaminated layers either mechanically or by bacterial oxidation of petroleum products in the soil. The method of burning oil from an environmental point of view is unacceptable. The most progressive method of cleaning oil-polluted soils is the biological method, which is based on the artificial contamination of the soil by specially selected types of bacteria. World experience shows the effectiveness of microbial purification of oil-contaminated soils.

Thus, the characteristic pollutant within the oil and gas fields are nitrogen compounds belonging to nutrients - one of the components of oil. Nitrogen is present in groundwater in the form of various inorganic and organic compounds. The study of the chemical composition of water shows that in all sediments they have a high degree of metamorphization. According to the genetic classification of Gulin, water belongs to the calcium chloride type, chloride group, sodium subgroup. With an increase in the depth of the horizons of the water become more mineralized and more thermal, the content of sulfates and hydrocarbonates is reduced or absent, in all waters there are microcomponents.

**Г.К. Мукушева, Н.С. Сарсембиева**

Досмұхамедов атындағы Атырау университеті

**ҚОРШАҒАН ОРТАНЫ ҚОРҒАУ ЖӘНЕ ҚОРШАҒАН ОРТАНЫ  
ҚОРҒАУДЫҢ МҰНАЙДЫ ӨТКІЗУШІ МАТЕРИАЛДАРЫНЫҢ ОТДЫҒЫНА  
ШЫҒАРУҒА АРНАЛҒАН ҰСЫНЫСТАРДЫ САҚТАУ**

**Аннотация.** Атырау мұнай өңдеу зауытынан қоршаған ортаға ластаушы заттар шығарын дыларын зерттеу көптеген жылдар бойы ыстықта қырып болып табылады, авторлар табиғат қатеріс әсерін төмендету және тұрақты



индустриалды дамуға көшу бойынша ұсыныс тәрізді. Ауа, судың ластану проблемаларын шешу және биоәртүрлілікті сақтау осы процестегі әрбір қатысушының әрекеттерінің жауапкершілігі мен ашықтығына негізделуі керек. Зерттеу барысында автор жүйе, салыстырмалы, факторлық талдау әдістерін, сондай-ақ экономикалық процестерді статистикалық талдау әдістерін қолданды. Жұмысты орындау барысында автор жалпы методологиялық принциптерді пайдаланды, олар мәселелерді барынша толық және объективті түрде зерттеуге мүмкіндік берді. Атырау облысындағы атмосфераға ластанушы заттардың шығарындылары Қарағанды, Павлодар және Шығыс Қазақстан облыстары сияқты өнеркәсіпті көңірлердегі шығарындылар көлемін етең. Зерттеуге шығарындыларды азайту бойынша ұсынымдар, еңалдымен, табиғаттың ластануына толық жауапты болу және әлемдегі тиімді болып табылатын мұнаймен ластанған топырақты микробтықтазалаудың әлемдік тәжірибесін қолдану болып табылады.

**Түйін сөздер:** шығарындылар, ластануәсері, қоршаған орта, өндіріс, азайту.

**Г.К. Мукушева, Н.С. Сарсембиева**

Атырауский университет имени Х. Досмухамедова

### **ИССЛЕДОВАНИЕ ВЫБРОСОВ ЗАГРЯЗНЯЮЩИХ ВЕЩЕСТВ ОТ АНПЗ В ОКРУЖАЮЩУЮ СРЕДУ И ВЫРАБОТКА РЕКОМЕНДАЦИЙ ПО ИХ СНИЖЕНИЮ**

**Аннотация.** Исследование выбросов загрязняющих веществ от Атырауского Нефтеперерабатывающего завода в окружающую среду является актуальной темой уже долгие годы, авторами произведена выработка рекомендаций по их снижению негативного влияния на природу и перейти на устойчивое развитие промышленности. Решение проблем загрязнения воздуха и воды, сохранение биоразнообразия должны базироваться на ответственности и прозрачности поступков каждого участника этого процесса. Объектом рынка труда выступает труд, а носителем труда - рабочая сила – трудовые ресурсы, которые характеризуются такими основными показателями как занятость и безработица. Исследования составили труды отечественных и зарубежных ведущих ученых-экономистов. В процессе исследования автором применялись методы системного, сравнительного, факторного анализа, а также методы статистического анализа экономических процессов. Выбросы в атмосферу загрязняющих веществ в Атырауской области на уровне с количеством выбросов в промышленно развитых регионах, таких как Карагандинская, Павлодарская и Восточно-Казахстанская области. Рекомендации, предложенные по сокращению выбросов в исследовании элементарны, прежде всего, нести полную ответственность за загрязнение живой природы и применять мировой опыт микробной очистки нефтезагрязненных почв, который является в мире наиболее эффективным.

**Ключевые слова:** выбросы, влияние от загрязнений, окружающая среда, выработка, снижение.

#### **Сведения об авторах:**

Мукушева Гульнара Кабдушевна - кандидат педагогических наук, Атырауский университет имени Х. Досмухамедова, <https://orcid.org/0000-0002-7354-9358>, mukusheva66@mail.ru;

Сарсембиева Нурия Сабиткызы – магистрант, Атырауский университет имени Х. Досмухамедова, [sarsenbieva\\_n@mail.ru](mailto:sarsenbieva_n@mail.ru), <https://orcid.org/0000-0003-2262-6859>

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