

**СЕКЦИЯ 3
ЕСТЕСТВЕННЫЕ НАУКИ**

Подсекция 3.3 Экология

STATE OF AIR POLLUTION IN THE WORLD AND KAZAKHSTAN

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The atmosphere is one of the necessary conditions for the emergence and existence of life on Earth. It participates in the formation of the climate on the planet, regulates its thermal regime, and contributes to the redistribution of heat near the surface. Due to the presence of oxygen, the atmosphere participates in the exchange and circulation of substances in the biosphere. Thus, atmospheric air is one of the main elements of the biosphere, with which a person is constantly in close contact [1: 4]. The quality of the atmosphere is understood as a set of its properties that determine the degree of influence of physical, chemical and biological factors on people, flora and fauna, as well as on materials, structures and the environment as a whole. The quality of the atmosphere depends on its pollution, and the pollution itself can get into it from natural and anthropogenic sources. With the development of civilization, anthropogenic sources are increasingly prevalent in atmospheric pollution.

On a global scale, the greatest danger is the pollution of the atmosphere with impurities, since atmospheric air acts as a kind of intermediary for the pollution of all other natural objects, contributing to the spread of large amounts of pollution over considerable distances. Industrial emissions (impurities) carried through the air pollute the world's oceans, acidify the soil and water, change the climate and destroy the ozone layer. Atmospheric pollution is understood as the introduction of impurities that are not contained in the natural air or change the ratio between the ingredients of the natural composition of the air. The value of concentrations of harmful impurities in the atmosphere is influenced by meteorological conditions that determine the transport and dispersion of impurities in the air, changes in wind direction and speed, and others. Harmful emissions from industrial enterprises and other sources of pollution have a negative impact not only on the environment, but also in some cases significantly affect the operation of technical equipment. For example, outdoor power plant equipment and overhead power lines are significantly affected by emissions from the combustion of organic fuels. Dust particles settle on the surface of the insulators. The amount of accumulated contamination reaches several tens of milligrams per 1 cm² of the surface, which leads to the formation of an electrically conductive layer on the surface of insulators. As a result, the discharge voltages of contaminated insulation can decrease several times during humidification. Environmental studies conducted in recent decades in many countries around the world have shown that the increasingly destructive impact of anthropogenic factors on the environment has brought it to the brink of crisis. Among the problem of pollution of irreplaceable natural resources – air, water, and soil – by industrial and transport waste has become the most threatening in various components of the environmental crisis (depletion of raw

materials, lack of clean fresh water, and possible climate disasters). In this regard, in modern society, the role and tasks of engineering (industrial) ecology are sharply increasing, which is designed to develop and improve engineering and technical means of environmental protection based on the assessment of the degree of damage caused to nature by the industrialization of production, and to develop in every possible way the foundations for creating closed and waste-free technological cycles and productions. The predominant impact on environmental pollution is exerted by enterprises of the metallurgical complex, electric power industry, fuel and chemical industries. The equipment and technology used to capture and neutralize emissions of harmful substances into the atmosphere is being improved very slowly, and therefore the level of utilization of captured harmful substances continues to be low.

Currently, the main share of energy is produced by burning or processing natural organ-containing raw materials-coal, oil, gas, oil shale, peat, as well as using the energy of rivers through the construction of hydroelectric power plants and the construction of reservoirs. Any of the modern methods of energy production and use (in industry, public utilities, agriculture, transport) is more or less associated with certain negative impacts on the environment [2:7]. The fight for the cleanliness of the air basin and the improvement of sanitary and hygienic conditions in cities and towns is an urgent task. The flow of combustion products moving through the flues of the boiler unit carries with it solid particles of fly ash and unburned fuel. Ash coming out of chimneys pollutes the atmosphere and the surrounding area. When solid fuel is burned in a bed, flue gases carry out an average of about 15% of the ash contained in the fuel, with the chamber combustion method and dry removal of slag, ash entrainment reaches 85-95%, and only a small part of the fuel ash is deposited in the furnace and in the flues in the form of slag and fly ash. The fly ash contained in the flue gases of boilers, the smallest particles of unburned fuel, nitrogen oxides and sulfur gases have a harmful effect on the human body, animals and flora. It should be recognized that at present it is impossible to completely eliminate industrial emissions into the environment. A certain share of air emissions is objectively determined by the current stage of development of energy production technology. However, in a specific economic situation, an increase in the use of low-quality fuel that does not meet the standards with high ash content and sulfur content not allowed. Energy is the heart of industrial and agricultural production and provides a comfortable existence for humanity. However, it is energy that is the largest industry in terms of air emissions. The main energy source in the 19th century was coal, the burning of which led to an increase in emissions of smoke, soot, soot, ash, harmful gas components: sulfur oxides, nitrogen oxides, etc. The main sources of volatile emissions in the energy sector are coal processing plants and briquetting plants, coal-grinding units, power and heating boiler plants. On the territory of the Republic of Kazakhstan, air pollutants are more than 3.5 thousand industrial enterprises located in 80 cities belonging to 1-5 classes of sanitary hazard. Since 1995, there has been an increase in the level of atmospheric pollution, which is explained by a certain revival of production in such sectors of the economy as heat power, mining and processing industries, as well as an increase in cargo transportation and the number of cars [3:25].

The bulk of pollutants come from enterprises of non-ferrous and ferrous metallurgy, heat and power engineering, and the oil and gas complex. The main problem is the increase in emissions of toxic substances – due to the use of non-project solid fuels with increased ash content (up to 40%). The regional structure shows high levels of pollution in the air basins of the Karaganda region (11108.1

thousand t), Pavlodar (433.7 thousand t), East Kazakhstan (243.8 thousand t) regions in 2000. About a third of industrial enterprises do not have sanitary protection zones that meet the standards. A significant part of the population of industrial centers lives in areas of direct emissions into the atmospheric air, noise, vibration of electromagnetic fields and other factors of influence. In most major cities, the contribution of road transport to air pollution continues to increase and reaches 60% or more, and in Almaty – 90% Of the total volume of emissions. the oxygen basin of Ust-Kamenogorsk contains heavy metal compounds, Almaty is suffocated by automobile smog, and the emissions from the air basin are reduced to the following levels: The Balkhash copper plant has brought lake Balkhash to the brink of an environmental disaster. A similar situation is observed in many other industrial regions of Kazakhstan. In recent years, the activities of the Baikonur international cosmodrome have had negative environmental consequences for the country's ecosystems. First of all, this includes emissions of ozone-depleting substances into the atmosphere, contamination with fragments of rocket carrier parts and remnants of rocket fuels on the earth's surface. A number of scientists believe that after each launch of the launch vehicle, a heptyl cloud is formed, which then spreads over the surrounding area for many kilometers and falls out in poisonous rains. As a result of the decline in production during the transition period, Kazakhstan significantly reduced its industrial gas (GHG) emissions. According to the results of the inventory, GHG emissions in Kazakhstan in 2012 amounted to about 65% of the level of 2010. Almost half of them came from the energy sector, as coal is the main fuel in the country's energy balance. In the Republic, the problem of ash and ash-slag disposal is acute waste, due to their huge annual outputs. The presence of toxic elements in ash – arsenic, mercury, beryllium, fluorine, Nickel-causes a constant threat of air, land and water pollution. The main contribution to air pollution is made by energy companies, whose emissions account for 40% of the total emissions in the Republic. Thus, energy is one of the main sources of environmental pollution in Kazakhstan. These are primarily thermal power plants that run on solid fuels, which are pollutants in all three environments: the atmosphere, hydro and lithosphere. The air basin is polluted with dust and harmful gases: nitrogen oxides, sulfur, and hydrocarbons. The dispersion of nitrogen and sulfur oxides by high pipes leads to further transport of these pollutants and their precipitation in the form of acid rain, which causes irreparable damage to nature. Therefore, the most important task is to limit these emissions, which is determined by GOST 17.2.3.02-78, according to which maximum permissible emissions (MPV) are set for each enterprise. A significant background of harmful substances, created primarily by road transport and industrial enterprises, has set the task of sharply reducing dust and harmful gas emissions for heat and power plants located in cities. These issues are very acute for the energy sector of Kazakhstan. This is due to the presence of a significant number of coal deposits in the Republic, most of which can be extracted by open-pit mining, providing cheap coal and electricity. Therefore, the energy sector of the Republic in the foreseeable future will develop mainly due to the creation of coal-fired thermal power plants. At the same time, the main part of energy coals is of poor quality. Their use in boilers is accompanied by great difficulties in ensuring a stable combustion process, reliable operation of equipment, and protection of the atmosphere from contamination with ash, nitrogen oxides, and sulfur [4:12].

Literature:

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