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WATER POLLUTION TREATMENT IN THERMAL POWER PLANTS

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Abstract
The factors that act on water resources come from urban areas, industries and agriculture where all these activities use water in large quantities and are closely related to it. Water is one of the basic and necessary conditions for the existence of life, and of every industry where economic and industrial enterprises are supplied with water from nature.
Alongside the requirements for water use, awareness is simultaneously being formed and developed about the ecological aspect and the consequences of water pollution as more and more attention is paid to the research of polluting substances in the hydrosphere, those accumulated, persistent, carcinogenic and biogenic.
Water is an indispensable substance for the living world, a substance without which there would be no life on Earth and represents one of the greatest challenges of humanity in the 21st century, as it is the main factor for the existence of life and an elementary substance necessary for the existence of the living world..
Keywords: pollution, waters, environment, thermal power plants, monitoring.

INTRODUCTION

According to expert data, the large amount of water on earth is a guarantee for an abundant supply of water to the inhabitants of our planet for all needs, from drinking water to water for industry, irrigation, energy, recreation and transport. The water problem in the world is increasingly urgent, since only 2.5% of the amount of water is fresh water suitable for use, which is widespread on our planet. Table 1.

Table 1. Total amount of water in the hydrological cycle [1].

Type of water	Volume, $km^3 \cdot 10^3$	% of total water
Oceans	362 033	97.5
Rivers	1.7	0.0001
Fresh lakes	125	0.0094
Brackish lakes	105	0.0076
Groundwater	7 000	0.5060
Moisture in the ground	50	0.0038
Polar water and glaciers	26 000	1.9250
Atmospheric water	13	0.0001
Total amount of water	1 350 400	100.0

At the current level of technical and technological development, a man cannot be supplied with water from every place in the hydrological cycle. First of all, he cannot use the water of glaciers at the poles of the Earth, where the largest amounts of water are located, for his own needs. However, water is not distributed equally in all parts of our continent, therefore, the amount of water that a man can directly use is limited and is not sufficient to meet the needs of humanity. The lack of water should be the starting point for any approach to water. During this, it is especially necessary to take into account the fact that a man's impact on a part of the water

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he uses is negative, which leads to serious consequences if water use is irrational and irresponsible.

EXPOSITION

CAUSES OF WATER POLLUTION

In the contemporary and intensive developments of urbanization, industry and agriculture, a large number of different water pollutants are present and with them the sources of pollution. The number of pollutants, in the domain of chemical substances, which are present both in everyday life and in industrial and food production, is quite dynamic. Therefore, according to the amount of polluting substances (with special emphasis on organic ones), industrial waste is in first place, followed by residential waste and agricultural waste [2].

The number of inorganic compounds that reduce the value of water is quite large. From the organic compounds that are increasingly present in surface and groundwater, we can mention: pesticides, synthetic materials from the chemical industry, detergents, mineral fertilizers, etc. These materials are not only dangerous to human health, toxic to fish, animals and living things, but also hinder the process of cleaning polluted waters. Warm water from cooling processes disrupts the process of photosynthesis in aquatic environments, respectively reduces the ability of water to transport (carry) oxygen, which disrupts the vital activity of plants and other living things in the aquatic environment. Suspended solids (even in dissolved form) also disrupt aquatic life and the process of photosynthesis in surface waters.

Waters containing heavy metals must undergo a process of their removal. Their removal can be done with various cation exchangers or by adsorption through active aluminum oxide [5]. If the waters also contain organic matter, then their purification is carried out by biological methods. This method is based on the natural process of water self-purification. Such water treatment is carried out with various biofilters, with intensive aeration and with the addition of sludge with aerobic bacteria, which mineralize organic matter. After these treatments, the water can be discharged into the environment without risking its pollution [11].

AVOIDANCE OF WATER POLLUTION

For the needs of planning and designing wastewater treatment plants, depending on the location, the relevant industry, the size and quality of the recipient and similar, research is carried out on the quantity and quality of wastewater and the recipient. Research is usually carried out by authorized institutions in support of previously drawn up programs. The database consists of the measurement and calculation of the flow of specific types of water, the results of physical, chemical and biological indicators for the analyzed waters [2].

Industrial wastewater requires a comprehensive study to a certain extent in order to predict the need for their preliminary treatment and to recognize the total pollution caused by them expressed through the so-called “equivalent inhabitant” [4].

Wastewater analyses are carried out for analytical samples in the field and in the laboratory. When settlements do not have a sewage system, then analyses are carried out only for industrial waters, eventually atmospheric waters and recipient waters. Where we have sewage systems, samples are taken at collectors, pumping stations and other important points. Samples must be taken at least once a week and for all seasons. In parallel, climatic changes in the region are also monitored (air temperature, wind, precipitation, etc.). Of particular importance is the temporal harmonization of flow measurement and quality assessment. For the water recipient, the assessment of quality during the summer and winter seasons is of particular importance because in summer chemical and biological processes are more active, while in winter they are less active, even though the oxygen concentration is higher [3].

MEASURES FOR MONITORING WATER POLLUTION

The ever-increasing consumption of water is accompanied by an increase in the amount of polluted water around us. Conflicts of various interests, which arise in the conditions of water use, condition the complex treatment of the problem of water protection. Given the complex problem of protecting water resources from various and numerous pollutants, activities of different nature must be undertaken to implement various measures. All activities for water protection can be summarized in the following measures: (1) legislative, (2) organizational and (3) technical.

Organizational measures in water protection are based on regular control of water quality through relevant institutions and specialized services. For this purpose, monitoring is established and the tracking of changes in certain water quality parameters in a wider region is organized. From the results obtained, a referral information system is created where all data on water quality are collected and stored. Based on this data, concrete steps can be taken to protect or improve water resources.

Technical measures are taken directly on the ground, where the implementation of legal norms comes into play and generally these measures have a preventive or repressive character. Preventive measures aim to completely eliminate or reduce the amount of wastewater in the area (on the spot). This is usually applied to industrial waters. Repressive technical measures mean the purification of wastewater, namely the establishment of a wastewater treatment plant. In this case, there are real conditions that, due to high investments and operating costs, the plant should be built in stages, these stages which must have a technological integrity.

In our country, wastewater (waste), from various industries, is discharged (poured) into the nearest waterways, which in this way become channels for the transport of waste materials, which limits or prevents the self-purification of natural water systems and, in addition, their use for certain purposes.

ENVIRONMENTAL POLLUTION FROM THERMAL POWER PLANTS

The Kosovo Electric Power Corporation, with its activities, starting from the exploitation of natural resources (coal) to the production and transmission of electricity, has a significant impact on the state of the environment. The existing facilities of this corporation were built in harmony with the technical and technological levels and with the laws in force at the time of their construction. All these facilities are outdated, so the technical and technological measures for environmental protection do not even remotely meet the necessary criteria. The current situation is unsatisfactory primarily as a result of the inability to maintain the systems for reducing pollution in function within the framework of the designed parameters, and as a result of the complicated situation that Kosovo has gone through in the last decade, and with them the Kosovo Electric Power Corporation.

The impact of Kosovo's thermal power plants on the environment is manifested in the pollution and degradation of air, water and soil. Statistics show that the concentrations of gases emitted into the atmosphere, soot and other particles are higher than the permitted limits. Also, solid particles in most cases are above the permitted limits, while in the vicinity of ash dumps during windy times there is a significant pollution of air and soil. A significant contribution to environmental pollution is also made by the facilities of the Kosovo "A" thermal power plant, with special emphasis on blocks A1, A2, A3, A4 and A5 with other accompanying facilities and the ash dump [8].

The cooling method, the type of auxiliary fuel (heavy fuel oil or fuel oil), the transport technology, the ash disposal and the chemical preparation of the water are factors that determine the type and quantity of waste water. In all thermal power plants, waste

water is obtained in the water preparation equipment, which after neutralization is used for hydraulic transport or is discharged into natural recipients. In thermal power plants that use fuel oil as an auxiliary fuel, such as the case of the Kosovo “B” thermal power plant, a considerable amount of water contaminated with fuel oil is obtained. The problem of cleaning these waters in the Kosovo “B” thermal power plant has not yet been solved. All lignite-fired thermal power plants apply hydraulic technology for ash transport, which is unacceptable from the point of view of water pollution. The Kosovo "A" thermal power plant has successfully implemented the new technology of hydraulic ash disposal, which has significantly alleviated the problem of air pollution, partially solved the problem of pollution of the Sitnica River, but not of groundwater.

In general, the main rivers in our country are relatively small and mainly originate from the nearby mountains. With the exception of the source part of the Ibar River, which is located outside the territory of Kosovo, all other watercourses are within the territory of the country. Most of these rivers are fed by natural precipitation and the amount of water depends on them. [9, 10].

CONCLUSION

In recent times, various natural resources have been intensively, carelessly and irrationally exploited to meet our needs. Throughout this, we encounter various and undesirable effects of such behavior. Even, the intensive exploitation of rivers is accompanied by various problems. It is almost impossible to find a river that, in the lower part of its course – the flat part, has preserved the properties of the ecosystem before man began to exert his influence with its intensive exploitation.

Surface waters in Kosovo, in addition to pollution that comes naturally, are also subject to pollution from wastewater discharged from residential and industrial centers. This is a significant problem, because urban and industrial waters, without any prior treatment, flow into the nearest rivers, whose flows fluctuate greatly during the seasons. The amount of discharged waters exceeds the self-cleaning capacity of the river bed. In this way, the quality of these waters is endangered and is accompanied by serious changes in its properties.

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