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Thermal Power Engineering and Environment

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In the modern world humanity needs thermal energy, because with its help we get heat and energy. But few people think about the damage caused to the environment, as well as the atmosphere. After all, polluted impurities are released into the atmosphere every day in large quantities.

For better heat consumption, which is generated at thermal power plants, the construction of stations takes place near cities, as well as industrial centers.

As the level of energy consumption increases every day in many parts of the world, a dangerous environmental situation arises. This leads to an intensive increase in impacts on the entire environment on a global scale. But today scientists are looking for ways to use natural organic resources more efficiently, less harmful to the world, which can be recycled. Also, to improve the environmental situation, many thermal power plants are improving the rationalization of processes and technologies [1].

Let's consider the stages of interaction between thermal power engineering and environment. There are 4 main phases of transformation of primary thermal resources: extraction and use of primary natural resources; processing of natural resources to a state that allows the use or transformation of resources; energy conversion of resources converted into thermal energy at thermal power plants; energy consumption [2].

These stages are in unity, but each of them has different processes, such as: technological, chemical, physical, and so

on. All processes differ in scale, time interval, energy consumption and many other characteristics. There is an improvement in technologies based on thermal power, which affect the components of the natural environment that affect the global environmental situation. In order to understand in depth how thermal power plants pollute the environment, it is necessary to consider all the resources they consume to generate heat and energy.

In the modern understanding, a qualitatively and quantitatively described resource means both a natural source to which a person is exposed, and the signs of this impact can be both positive and negative. The development of thermal power engineering as a combined system for the use of natural resources began at the beginning of this century. At the stages of the appearance of thermal energy, the main source was firewood, muscle energy of people and livestock. In the 20th century, there were drastic changes in the structure of heat consumption, which soon became the causes of environmental pollution. Internal combustion engines appeared in industrial thermal technologies, agriculture and in other industries.

A watershed event was the opening of a nuclear power plant. Nuclear fuel belongs to the category of non-renewable energy sources. Such power generation produces more heat than a conventional thermal power plant, but for this it consumes a huge amount of fuel, which leads to an increase in environmental pollution. All types of power plants consume various components of fuel combustion products, which, in turn, are released into the atmosphere, lithosphere and hydrosphere, and each behaves differently when in the natural environment, are called emissions of pollutants.

The consequences of such emissions are unfavorable. Getting into the environment, they affect the health of the population, agriculture; the climatic conditions in certain areas of the world are deteriorating, and much more.

Based on the above, we can distinguish the main groups of interactions between thermal power plants and the natural environment:

1. The accumulation of combustion products on water, which leads to a change in its color and albedo;

2. Release of solid fuel into water and on land during transportation, processing and transshipment;

3. Heat dissipation. The consequence of this is a constant local increase in the temperature of the reservoir, a change in the ice situation, a change in the distribution of precipitation, evaporation and fog.

Scientists report that the main type of emissions of impurities from power plants falling on the surface of the hydrosphere and lithosphere are solid particles that are transported by flue gases into the atmosphere and settle on the surface, as well as enriched with fuel. In general, the following main types of negative impact on the environment can be distinguished: greenhouse effect; huge oxygen consumption; pollution by sewage; acid rain; thermal emissions [3].

Pollution and waste from power plants in the form of gas, liquid and solid phases are distributed in two streams: one causes global changes, and the other causes local changes. Therefore, it should be noted that thermal power plants currently emit about 20% of the total amount of all harmful industrial waste into the atmosphere. The most harmful are condensing power plants running on low-quality fuel.

In order to prevent the pollution of our Earth with various emissions, we can suggest the main ways of burning emissions and fuel:

1. Flue gas desulfurization and removal of sulfur from fuel before combustion;

2. Reduction of nuclear power plant emissions: creation of special systems for neutralization and disposal of radioactive waste.

Having considered the important aspects of the interaction of thermal power engineering and the environment, it can be concluded that at present the thermal power industry is at the peak of its development, research and use of energy resources are reaching the highest rates. In the near future, a reduction in the volume of mining is expected, which will negatively affect the global energy sector [4].

Environmental pollution is a problem not only for this industry, but also for the entire industrial complex as a whole. Modern methods of industrial waste management are unreliable and often lead to adverse environmental consequences. Heat engineering is the main pollutant of atmospheric air. If humanity does not find more effective cleaning methods or develop approaches to using more environmentally friendly energy sources, our descendants will pay for their health in the near future.

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