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CONTROL OF PUMPING INSTALLATIONS OF THERMAL AND NUCLEAR POWER PLANTS ON THE BASIS OF IMPLEMENTATION OF ENERGY-SAVING SUPPLY

Currently, the reserves for increasing the efficiency of steam turbine power plants due to the increase of initial parameters, improvement of systems of regenerative heating of feed water and intermediate superheating of steam are practically exhausted. At the same time, the aggravation of problems in the fuel-energy-energy complex and the deterioration of the environmental situation dictates the need for a systematic approach to solving the problems of improving the efficiency and environmental characteristics of thermal power plants and nuclear power plants. In this regard, in the energy sector, a lot of attention has been paid to low-potential complexes of power plants as structural units of power units, which have a direct impact on the economy of their operation due to the influence on the final parameters of steam and on the consumption of electricity for own needs. According to Zaporizhzhya NPP, underproduction of electricity due to poor heat exchange conditions in condensers is about 1.5 billion kWh annually.

Therefore, ensuring optimal modes of operation of condensing units, minimizing all types of energy losses in them represents an important and urgent scientific and technical problem. This problem can be solved by creating energy-saving systems of automatic control of the operating modes of low-potential complex systems, in particular - steam turbine condensers.

In the direction of solving the specified problem, theoretical studies were conducted and the following main results were obtained.

1. The task of creating an energy-saving system of automatic control of the operating modes of steam turbine condensers, which ensures a given ratio of the consumption of incoming steam and condensate with minimum power consumption of the ejector unit and circulation pump, is formulated.

2. A mathematical model of the working processes of the condenser has been developed, which takes into account the processes of heat exchange and steam condensation, the operation of the steam ejector unit and the circulation pump.

3. A general functional scheme of the energy-saving ACS with condenser operating modes has been developed using the reference model of the object and the model of deviations of the main parameters from the specified values, capable of automatically forming optimal setting effects on the performance regulators of the circulation pump and the ejector unit in order to ensure minimal power losses.

The work was carried out under the supervision of an associate professor of the department Viktoriia Kniazieva