

UDC 621.121

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ANALYSIS OF THE MAIN APPROACHES TO THE ASSESSMENT OF THE CONDITION OF TPP AND NPP EQUIPMENT

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Introduction. Modern energy, like other fields of science and production, is under the direct influence of the scientific and technological revolution. The development of the energy industry is characterized not only by rapidly growing energy consumption of all types, but also by very significant structural changes in the production, transportation and distribution of electricity.

The expected growth of the electric power industry at the beginning of this century is caused by the rapid development of all branches of industry, agriculture, and the increase in the population, which is impressive in its scale. The consumption of organic fuels has increased several times over the last decades, and the need for fuel has a sharply pronounced growth trend [1].

A set of installations that convert the chemical energy of organic fuel into thermal and electrical energy works as part of electrical plants (thermal or nuclear). The main purpose of power stations is to provide electrical energy to enterprises of industrial and agricultural production, utilities and transport. Power plants can also provide businesses and residential buildings with steam and hot water.

Purpose of this work. The purpose of the work is to analyze the main approaches to assessing the condition of TPP and NPP equipment.

A large number of articles, publications, and magazines are devoted to these problems. Based on them, the issue of finding optimal solutions in thermal power plants and nuclear power plants to increase efficiency and improve the useful operational properties of power stations was considered.

The common part. The elements of the power unit can be affected by aging processes that occur over time or as a result of long-term use. The negative

impact of aging can lead to the degradation of the element, namely to the deterioration of its reliability and, as a result, the safety of the power unit as a whole.

To control the aging of the element, the determining parameters of the state of the elements and their maximum permissible values are established, as well as the methods and means of control of these parameters are selected. At the same time, preference is given to non-destructive control methods, as well as methods that can be applied to elements in work [2].

The development and implementation of measures to slow down aging processes and to ensure reliable operation of elements during the reassigned resource period is a mandatory type of activity for managing the aging of thermomechanical equipment and pipelines. As practice shows, the durability of elements of NPP power units is mainly determined by the activity of erosion-corrosion and other wear-and-tear processes. At the same time, other reliability criteria, primarily for low-cycle fatigue, meet regulatory requirements [3].

The term of operation of NPP power units assigned by the project with a high probability gives confidence that critical elements, as well as the NPP unit as a whole, subject to appropriate maintenance, repairs and operational control, will meet safety criteria during this term [4].

Inspection of the technical condition in order to extend the life of the equipment includes the following stages of work: analysis of technical documentation; analysis of operating experience; assessment of the technical condition by defining parameters; assessment of technical condition according to strong parameters; estimation of the residual resource based on the results of measuring the limit state parameters; making a decision on the possibility of extending the life of the equipment and drawing up a conclusion.

Monitoring of aging processes is carried out in order to obtain timely and reliable information about the state of the aging processes of the element. To monitor the aging process of a specific element of a power unit, the dominant aging mechanisms that make the main contribution to the aging process are selected from the total number of aging mechanisms of this element. The methodology for selecting the dominant aging mechanisms is determined by typical technical condition assessment programs for the relevant elements of power units.

Monitoring of the technical condition of the elements is performed by monitoring the established parameters and characteristics that determine the technical condition of the elements, during their operation, during tests, measurements, operational control of metal, repairs and maintenance of the elements. Monitoring should be carried out systematically throughout the entire life of the power unit. In turn, technical diagnostics monitors the current state of all elements, detects abnormal conditions, determines the causes of their appearance, which allows you to assess the situation and take measures to eliminate them.

When equipping NPP power units with a technical diagnostics system, the following systematic approach is used: the results of measuring the parameters of the power unit of the standard automatic process control system provide sufficient information about the operating modes and the condition of the equipment, and to solve the diagnostic problems, it is necessary to properly organize data collection and their processing.

On the basis of monitoring the aging processes and the technical condition of the elements of the power unit, requirements are established for the performance of additional work (measurements, metal control, tests, etc.) for the main volumes of work during periods of major repairs to justify the possibility of extending the resource/life of elements, reassigning their resource is carried out as part of major repairs.

The purpose of technical diagnostics of equipment is to conclude about the serviceability and efficiency of a specific type of equipment, and the means of technical diagnostics should ensure the detection of defects that affect the efficiency of the diagnosed equipment and ensure the prediction of its residual resource.

Conclusions. An analysis of the main methods and approaches to assessing the functional state of thermal power equipment of TPPs and NPPs has been carried out.

The main stages of monitoring and management of the equipment aging process are considered

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